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**THE IMPORTANCE OF AFRICAN BIOETHICS IN THE DEVELOPMENT OF NEW
ARTIFICIAL INTELLIGENCE TECHNOLOGIES IN HEALTHCARE**

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“This mini-dissertation is submitted in partial fulfilment of the requirements for the degree of
Master of Laws in Medical Law”

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ABSTRACT

Artificial intelligence involves the completion of a task by a computer, whilst using human intelligence. Within the healthcare system, artificial intelligence is proving to be very useful in that it helps make accurate diagnoses of patients, recommend effective treatments, and keep track of patient records, amongst other applications. Artificial intelligence technology being used within healthcare sectors mean that its applications will involve helping people when they are at their most vulnerable state. Thus, it is natural for there to be regulations in place to govern its usage and development.

When scholars try to assign universal regulations for artificial intelligence in healthcare, there are conflicting opinions on the various ethical principles which should be considered. Furthermore, one of the pressing questions which need to be dealt with considers who will be responsible when artificial intelligence malfunctions, resulting in a patient being harmed. Another matter that would need attention involves the bias found in artificial intelligence algorithms, stemming from Western and Eurocentric data that is collected and used to train the algorithms. Most of the developments of artificial intelligence come from developed nations that have a less diverse population. As such, the data collected and used to train algorithms would be biased toward and beneficial for those populations. The main issue, in this regard, comes from implementing the same artificial intelligence technology within healthcare systems of developing nations that have a diverse population. The algorithm would be biased against and less beneficial towards developing nations. Any ethical principles included in the regulations for artificial intelligence, would need to be inclusive of the unique experiences of the various populations from developing nations.

This dissertation aims to highlight the importance of including African bioethical principles when creating legislation that would be used to regulate the development, implementation, and usage of artificial intelligence in healthcare.

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To my mom, thank you for all your constant support and guidance.

You are my role model.

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CHAPTER 1

INTRODUCTION

1.1. INTRODUCTION

Artificial intelligence is quickly presenting great potential in terms of developments of technology in healthcare. Many of the useful artificial intelligence technological advances in healthcare deal with machine learning algorithms which focus on data collection. The algorithm refers to the system of the artificial intelligence technology, this system works as well as the data which is used to train it.¹

Most of the known developments in artificial intelligence have emerged from developed nations including as the United States of America, which means that the algorithm is trained on data obtained from countries where there is not as much diversity as can be found within African countries.² Thus, most of the ethical and legal considerations view artificial intelligence usage and governance in relation to a consensus surrounding norms found mostly in developed nations.³ As such, the bioethical considerations of artificial intelligence may be most appropriate to those countries.⁴

The use of artificial intelligence is increasing within the healthcare sector, helping to improve and modernise healthcare remedies. This became a more rapid and recent development following COVID-19 and the new technologies that were built to combat the increasing infection rate. An example of such emerging technology includes an artificial intelligence algorithm which was used in the diagnosis of COVID-19, created by researchers in New York.⁵ This algorithm was trained using the data obtained from computerized tomography scans (CT scans) of the lungs of affected patients. Another example includes an algorithm created by researchers at the Massachusetts Institute of Technology, which can detect the presence of the virus within the cough of an individual.⁶

¹ S Naidoo et al 'Artificial intelligence in Healthcare: Proposals for Policy development in South Africa' (2022) 15(1) *SAJBL*, p11–16. <https://doi.org/10.7196/SAJBL.2022.v15i1.797>.

² *Ibid.*

³ *Ibid.*

⁴ *Ibid.*

⁵ P Joi 'How Artificial Intelligence Could Help the Fight Against COVID-19' (Gavi) available at <https://www.gavi.org/vaccineswork/how-artificial-intelligence-could-help-fight-against-covid-19>, accessed 03 November 2023.

⁶ *Ibid.*

The World Health Organisation (WHO) began to acknowledge the contributions that AI could have in healthcare and how beneficial these contributions could be, in terms of the greater good for global healthcare.⁷ Along with this acknowledgement, the WHO has put forth six broad principles which should be considered when creating a framework that would govern artificial intelligence technology. Scholars have recognised a need for an ethical and legal framework which would regulate this usage of artificial intelligence in healthcare.⁸ In realising this, many scholars have attempted to attach ethical considerations and legal frameworks that would govern the usage of artificial intelligence in technology.

Predictably, it was inevitable for artificial intelligence to be used within healthcare sectors all over the world. Teachings from bioethics, more specifically western bioethics, are what scholars frequently consider when it comes to creating this framework. Bioethics could be summarized as a discipline which provides ethical principles to be applied to the issues found within the scientific or medical field. The interpretation of these ethical principles has largely surrounded western norms and cultures. Technically, ‘western’ bioethics would be a good way to govern artificial intelligence in healthcare, in the West. However, the same might not be true for other areas around the world. African bioethics and Western bioethics, whilst perceived as similar, there are notable differences. African bioethics has a focus on working towards the good of a community, whereas Western bioethics focuses on the good of an individual. As such, for artificial intelligence in healthcare to reach its full potential in African countries, the legal and ethical consideration used to regulate artificial intelligence would need to centre around an African perspective of ethics as opposed to the Western view.

The main research problem is the need for African bioethics to be considered when a legal and ethical framework is designed to regulate the usage of artificial intelligence in healthcare systems. African bioethics contains a set of values which would allow for a more inclusive legal and ethical framework, which is intended to be used within African countries. Overall, for there to be effective regulations in place, which would govern the development, implementation, and usage of artificial intelligence technology in healthcare, it is necessary that scholars pay heed to the African perspective on ethics.

⁷ ‘Use of Artificial Intelligence on the Rise, But its Impact on Health Still Limited, New Study Finds’ (World Health Organization) available at <https://www.who.int/europe/news/item/27-09-2022-use-of-artificial-intelligence-on-the-rise--but-its-impact-on-health-still-limited--new-study-finds>, accessed 30 June 2023.

⁸ C W Park et al ‘Artificial Intelligence in Health Care: Current Applications and Issues’ (2020) 35(42) *Journal of Korean Medical Science*.

1.2. STATEMENT OF PURPOSE

The purpose of this mini-dissertation is to highlight the importance of an African bioethical perspective with regard to developing a regulatory framework for artificial intelligence in healthcare within African countries. Bioethics is most appropriate in a country where the culture and norms look more towards protecting the individual, such as is the norm in Western countries.⁹ Whereas the African perspective on ethics, also known as African bioethics, would include considerations which are unique to experiences found within a majority of African countries, that is to consider what is good for the community. The African perspective on ethics is one which considers the bioethical principles in a way which allows for the implementation of these principles to be more inclusive to norms which are commonly found within African societies.

Overall, this topic is contemporary and appropriate as it sheds light on the need for a legal and ethical framework which would regulate the usage of artificial intelligence in healthcare. This is a topic which requires further research and study, especially if the framework created to regulate the usage of artificial intelligence in healthcare, would be applied within multiple African countries, such as in South Africa.

1.3. LITERATURE REVIEW

The main aim of this dissertation is to highlight the importance of having an African perspective of ethics when it comes to governing the usage of new artificial intelligence technologies in healthcare.

Some authors, such as in *Owoyemi et al*¹⁰, maintain that most developments of artificial intelligence occur in foreign developed nations. As such, the bias found in artificial intelligence algorithms will be in favour of such countries and it would be a bit challenging to simply implement artificial intelligence technology as it is within African healthcare systems. They note that in terms of governance, both African and Western countries are uncertain when it comes to who bears responsibility when artificial intelligence technology used in healthcare is

⁹ S Chattopadhyay & R De Vries 'Bioethical Concerns are Global, Bioethics is Western', (2008) 18(4) *Eubios J Asian Int Bioeth.*

¹⁰ A Owoyemi et al 'Artificial Intelligence for Healthcare in Africa' (2020) 2(6) *Front Digit Health.* doi: 10.3389/fdgth.2020.00006.

harmful towards the vulnerable citizens. For its usage within African healthcare systems, African countries must work towards enacting laws which are in line with African perspectives on ethics, to provide governance and protect those using artificial intelligence.

In the article “*The inconvenient truth about AI*”¹¹, the authors speak in relation to implementing artificial intelligence in the healthcare within the United Kingdom. It was noted that artificial intelligence could not be used in clinical practice and one of the main reasons for this related to the lack of inclusion when it came to developing artificial intelligence systems and collecting enough data to accurately train artificial intelligence algorithms. Overall, the authors found that artificial intelligence has a lot of potential within healthcare however, it cannot effectively be implemented within a society without infrastructure in place which promotes inclusion. From this, it is reiterated that the legal and ethical infrastructure in place to govern artificial intelligence needs to be developed in a broad and inclusive way, to ensure effective use of artificial intelligence within the healthcare system of a population.

*Naik et al*¹² considered the concept of accountability in relation to the usage of artificial intelligence in healthcare. This comes with considering who should be held responsible for errors made by artificial intelligence when treating a patient or dealing with sensitive patient information. One of the things that the authors note was the bias which is found in artificial intelligence being used by an underrepresented patient group, exposing that the algorithm is likely to fail in this regard, resulting in a misdiagnosis, amongst other potential dangers. Overall, in addressing the ethical issues, the authors note that policy makers must proactively tackle moral dilemmas which inevitably arise when enforcing artificial intelligence within the healthcare of a population. As such, to encourage the usage of AI within a population, the ethical considerations used in governing artificial intelligence, must align with the individualised perspective of that population.

*Sharma*¹³ provided a view into the development and implementation of artificial intelligence and machine learning algorithms through the lens of a healthcare system in a third world country, such as India. The author posits that artificial intelligence would be useful as, amongst other things, it would help to lighten the load of work given to healthcare professionals, a result

¹¹ T Panch, H Mattie & L A Celi ‘The Inconvenient Truth About AI in Healthcare’ (2019) 2(77) *npj Digital Medicine* <https://doi.org/10.1038/s41746-019-0155-4>.

¹² N Naik et al ‘Legal and Ethical Consideration in Artificial Intelligence in Healthcare: Who Takes Responsibility?’ (2022) 9(862322) *Front.Surg.*

¹³ A Sharma ‘Artificial Intelligence in Healthcare’ (2021) 5(1) *International Journal of Humanities, Arts, Medicine, and Science*, p106 – 109.

of the large population within India, and allowing for healthcare professionals to spend more time with patients without having to overwork and finish all of the paperwork etcetera. Overall, the author predicts that artificial intelligence would allow for the healthcare system to work more efficiently and be more affordable for citizens. This article highlights how integral the consideration of bioethics within a third world country is, when it comes to implementing artificial intelligence technology in the healthcare system of that country. It is important to consider the unique situations found within a country before implementing technology which could drastically change how an integral governmental system would function.

Artificial intelligence has great potential within the healthcare sector, which is why it is important that proper legal and ethical frameworks are in place to govern its usage. Many authors, such as *Davenport*,¹⁴ have maintained that artificial intelligence has a lot of potential for growth. Within healthcare systems, the usage of artificial intelligence would largely be in machine learning algorithms and imaging analysis. Both of these forms of artificial intelligence depend on data collection, thus, should artificial intelligence be implemented globally, the data that is collected would need to be inclusive.

*Naidoo et al*¹⁵ reviewed an online workshop which identified five issues that required policy development in order for artificial intelligence to be used effectively in healthcare. These five issues include, firstly outdated legislation, secondly data and algorithm bias, thirdly the impact that artificial intelligence technology has on healthcare workers, fourthly the uncertainty surrounding liability, and lastly the lack of development of artificial intelligence within the South African healthcare sector.¹⁶ The article reviewed these issues and recommended ways to develop policies for usage of artificial intelligence in the South African healthcare system. The authors point out that scholars have identified a consensus of artificial intelligence ethics, which is said to be applied all over the world, however, they have failed to account for the African perspective of ethics. Overall, this article illustrates the importance of considering African perspectives when making laws which regulate artificial intelligence in healthcare in South Africa.

As such, a preliminary literature review provided commentary on the potential of artificial intelligence in healthcare. However, they have also noted the bias found in artificial

¹⁴ T Davenport & R Kalakota 'The Potential for Artificial Intelligence in Healthcare' (2019) 6(2) *Future Healthcare Journal*, p94-98.

¹⁵ Naidoo et al *op cit* note 1.

¹⁶ *Ibid*, p11.

intelligence, specifically in terms of data collection for artificial intelligence algorithms. The bias found in these algorithms can be very dangerous as it could result in a patient being misdiagnosed and receiving improper treatment.

The literature repeatedly highlighted the main reason as to why African bioethics needs to be included when creating legal and ethical frameworks that would regulate and promote the usage of artificial intelligence in healthcare, within African countries, which relates to the need for a diverse and inclusive interpretation on what is considered ethical. It is important to include African perspectives as it ensures that there are principles in place which are relevant within an African context.

It is important that when creating this framework, there is an inclusion of the norms, cultures and concept of morality found in the society where this framework will be implemented. However, there are some who scholars have posited that the frameworks created to regulate artificial intelligence technology in healthcare need to be done in accordance with the global bioethics' standards. There are also arguments in place which set out why a framework based on global bioethics would only be effective within developed nations, but insufficient when implementing such a framework within developing nations.

Additionally, the literature also provides necessary insight into the need for inclusivity when creating regulatory frameworks.

1.4. RESEARCH QUESTIONS

In order to provide an argument for this topic, there are three main research questions:

- *What is the potential of artificial intelligence technology in healthcare?*
- *What are the fundamental principles of Western and African bioethics?*
- *How can African bioethics be used to develop an ethical legal framework for the use of artificial technology in healthcare in the South African context?*

1.5. RESEARCH METHODOLOGY

The dissertation is a complete doctrinal research (or desktop) study. Doctrinal Research is also known as desktop study and involves finding the sources of law and analysing them.¹⁷ This type of research is appropriate for the dissertation as all of the research for this topic will rely on information provided by journals, websites, books, and case law. The research for this topic will not involve any experimentation on human beings, collection of personal data, collection of surveys, or disclosure of personal information of any kind. All of the information used for this mini-dissertation has already been made public information and can be found in the public domain. Thus, in answering the research questions, reference will be made to information found on these platforms.

1.6. OVERVIEW OF DISSERTATION

In this mini-dissertation there will be a total of five chapters.

Chapter 1 is the introduction to the mini-dissertation. The aim of this chapter is to illustrate the vision for this research, in terms of providing an argument which is in favour of, and relevant to the topic. In this chapter, there are an overview of this research-based mini-dissertation, a literature review contains key points which will be emphasised throughout the research, a background of the topic, as well as an insight into the three main research questions. There is also an introduction to each of the chapters to follow.

Chapter 2 will discuss artificial intelligence within the healthcare sector. The aim of this chapter is to provide a background into the artificial intelligence technology that is used within healthcare sectors. Furthermore, there is a submission that development and usage of artificial intelligence technology in healthcare needs to be regulated, and in doing so, policy makers need to ensure that the principles considered are in line with the norm, culture and view of morality found within that society. In this regard it is important that the regulatory framework can be effectively implemented within that society, thus there cannot be a consideration of principles which do not fit within that society as well as it would in another society. In this chapter, there will be a definition for artificial intelligence, insight into the current artificial intelligence technologies in healthcare, the potential of artificial intelligence in healthcare.

¹⁷ T Hutchinson & N J Duncan 'Defining and Describing What We Do: Doctrinal Legal Research' (2012) 17(1) *Deakin Law Review*, available at <https://www.researchgate.net/publication/304034393>, accessed 12 November 2023.

There will also be a discussion on the current legal and ethical framework in place to govern artificial intelligence.

Chapter 3 is focused on bioethics. The aim of this chapter is to provide insight into the concept of 'bioethics,' as a whole, whilst pointing out that a certain critique of bioethics emphasises a gap in this concept which would hinder the effectiveness of any framework created in various countries that are based on these principles. This chapter will provide a background for the concept of bioethics. In doing this, there will be a brief discussion on where the concept comes from, being that the discipline has been largely interpreted within the western context. There will also be some insight as to why this view of ethics is less appropriate within the context of an African country.

Chapter 4 will describe African bioethics. The aim of this chapter is to highlight the importance of an African perspective on ethics when creating a framework which would regulate the development, implementation, and usage of artificial intelligence technology within the healthcare sectors of African countries. In this chapter, there will be a definition of African bioethics and a discussion on the history of African bioethics. There will also be a very brief discussion on bioethics and how it differs from Western bioethics. Following this, is an argument for why African bioethics is most appropriate within an African context. Furthermore, there will be an acknowledgement of critiques on the concept of an African bioethics, as well as an indication as to why there is a need for African bioethics.

Chapter 5 provides a conclusion. The aim of this chapter is to provide clarification in terms of the three main research questions. In this chapter, there will be an overview of all the information provided in the previous chapters as well as some final commentary.

1.7. CONCLUSION

Throughout this mini-dissertation, there is an opinion that African bioethics plays an important part in creating a legal and ethical framework that would govern the current and future usage of artificial intelligence, throughout the African continent.

Artificial intelligence technology will continue to play an important role within the healthcare sector, thus it is necessary that an appropriate framework is established to regulate the development, implementation, and usage of this technology. The reason as to why such a

framework is needed, relates to the fact that there needs to be an assurance that the patient who will be most impacted by the implementation of artificial intelligence in healthcare is safe.

Although considerations are made in favour of adopting principles of bioethics when in the creation of these frameworks, it is necessary that scholars remember that there needs to be inclusivity in terms of the interpretation of these principles, to ensure that it is relevant to the norms of the society, within which the framework will be implemented.

Thus, there is an introduction into the concept of African bioethics, which speaks to the African perspective on ethics. Africa, as a continent consists of fifty-five African countries, and each country comes with its own unique history, culture, and norm.¹⁸ This mini-dissertation will provide insight into the fact that although each African country differs, there is a common view found, which relates to the importance of community. The good of the community is one value which could be viewed as a basis for the concept of African bioethics.

¹⁸ 'Member States' (African Union) Available at https://au.int/en/member_states/countryprofiles2, accessed 12 November 2023.

CHAPTER TWO

ARTIFICIAL INTELLIGENCE TECHNOLOGY IN HEALTHCARE

2.1 INTRODUCTION

2.1.1. Overview

The previous chapter demonstrated what the dissertation sets out to accomplish and ensuring that the structure of the dissertation is in line with the core purpose. This chapter provides an introduction of artificial intelligence, showing a brief history of how it made its way to the healthcare sector, becoming an integral part of healthcare advancements all over the world. In terms of regulating the development and implementation of these artificial intelligence technologies, there are certain foundational ethical principles which are suggested, since (at the time of writing) there is currently no regulation of artificial intelligence in healthcare within the sector, anywhere in the world. There is a danger in not having the necessary regulations for these technologies, especially within the healthcare sector, as the people who would be the most impacted by the application of artificial intelligence are the patients, and patients are in a vulnerable state. Without regulations, there is no security in terms of who would be responsible should there be a malfunction in the artificial intelligence which lead to a patient suffering adverse effects, following a misdiagnosis or improper treatment plans suggested by artificial intelligence.

In this chapter, there is also a brief discussion of a few of the available artificial intelligence technologies taking space within the healthcare sector, followed by an overview of the potential that artificial intelligence technologies have in healthcare for the future. There still exist some criticism regarding various aspects of regulating and implementing artificial intelligence technology which is used in healthcare. Furthermore, there is some insight on the implementation of artificial intelligence within the healthcare sectors of African countries, as well as some issues which are said to provide a hindrance to the successful implementation of these technologies.

2.1.2. Background and overview of artificial intelligence in healthcare

Artificial intelligence can be defined as a computer-based system which can display human intelligence, such as comprehending new information and applying the knowledge to help solve

medical issues.¹⁹ In order for a system to be seen as artificial intelligence, it needs to pass the ‘Turing test’, which was established by Alan Turing in the 1950s.²⁰ The ‘Turing test’ is a test which determines whether a computer system is capable of human intelligence, and if it is then it can be considered as artificial intelligence technology.²¹

As illustrated in *Kaul et al*,²² artificial intelligence was initially created to make informed decisions on behalf of humans. This was followed by the creation of a piece of artificial intelligence technology called ‘Eliza’; by Joseph Weizenbaum, which could be considered as the first chatbot which became the basis for modern day artificial intelligence chatbots, ‘Eliza’ used natural language processing to imitate and generate typical human correspondence.²³ The robot, which would potentially have various advanced uses in healthcare, was first created in 1966 and it could be instructed to do something, understand what was taught, as well as carry out an instruction.²⁴ Around the same time that the robot was successfully created, an idea was formed which would become the basis of usage of artificial intelligence within healthcare, this was the idea of processing data that was collected into a digital format.²⁵ *Kaul et al*²⁶ describes how deep learning, a subcategory of machine learning, is important when it comes to advancing artificial intelligence in healthcare systems. The importance is found in its ability to be trained on data and learn from it without having a human insert the information, furthermore, it could take note of symptoms to make a diagnosis.

Within the healthcare sector, artificial intelligence provides a significant amount of support in terms of capturing, processing, as well as analysing data, such as the personal information of a patient.²⁷ Using algorithms, it is likely that it can learn from the information that is used to train it and provide near accurate diagnosis of patients, allowing for accurate and effective treatments to be implemented, and leaving less room for human error.²⁸ Overall, with the implementation

¹⁹ M Chen & M Decary ‘Artificial Intelligence in Healthcare: An Essential Guide for Health Leaders’ (2020) 33(1) *Healthcare Management Forum* 10-18.

²⁰ B S George & A S Gillis ‘Turing Test’ (TechTarget) available at <https://www.techtarget.com/searchenterpriseai/definition/Turing-test#:~:text=The%20Turing%20Test%20is%20a,cryptanalyst%2C%20mathematician%20and%20theoretical%20biologist>, accessed 5 November 2023.

²¹ *Ibid*.

²² V Kaul et al ‘History of Artificial Intelligence in Medicine’ (2020) 92(4) *Gastrointestinal Endoscopy* 807-812.

²³ *Ibid* 808.

²⁴ *Ibid*.

²⁵ *Ibid*.

²⁶ *Ibid* 809-810.

²⁷ Chen & Decary *op cit* note 18, p10-18.

²⁸ F Jiang et al. ‘Artificial intelligence in healthcare: Past, present and future’ (2017) *Stroke and Vascular Neurology*. doi:10.1136/svn-2017-000101.

of artificial intelligence technology, there is an extra assurance of accuracy in terms of predictions.

Artificial intelligence provides an upgraded level of service compared to typical healthcare technology, because it learns from, and adds to the knowledge of, healthcare experts.²⁹ This is what makes it a potentially better resource than well-known healthcare technology. Realising its potential application within healthcare, the WHO released a guideline that would showcase the ethical principles which should more or less be considered when governing the usage of artificial intelligence in healthcare.³⁰ These principles are further discussed within this chapter.

It is noted that the use of artificial intelligence in healthcare systems allow for a better chance when it comes to making accurate diagnoses and providing effective treatment to patients.³¹ However, as noted in *Panch et al*³² there is a big gap that is evident when it comes to implementing artificial intelligence technology in the countries that have a more diverse population, compared to the western and European countries where the majority of artificial intelligence technology used in health care, is developed. The authors referred to the implementation and usage of artificial intelligence technology in the healthcare system within the United Kingdom, noting that although there was a lot of potential when it comes to the usage of artificial intelligence, it needs to have infrastructure in place that would promote the inclusion of a more diverse dataset upon which to train artificial intelligence algorithms.³³ This presents a potential obstacle in implementing AI systems in healthcare in certain jurisdictions.

There are a number of scholars who share this view. As accurately provided in *Owoyemi et al*³⁴, developments of artificial intelligence used in healthcare systems mostly occur in foreign developed countries, which means that the bias found within artificial intelligence algorithms will be in favour of those countries, thus there is no opportunity to collect more diverse information that will be used to train the algorithms before they are sent off to be used in countries all over the world. In addition to this no clear regulations to govern the usage of

²⁹ Park et al *op cit* note 8.

³⁰ World Health Organization. Ethics and Governance of Artificial Intelligence for Health: WHO Guidance. Geneva. (2021).

³¹ Chen & Decary *op cit* note 18, p10-18.

³² Panch et al *op cit* note 10.

³³ Ibid.

³⁴ Owoyemi et al *op cit* note 9.

artificial intelligence exist and there is uncertainty regarding the question of who would be responsible for artificial intelligence in healthcare.³⁵

To effectively implement artificial intelligence within healthcare systems in African countries in a way that will allow the technologies to reach their full potential, regulations that take into account the African context and that are in line with African perspectives on ethics are appropriate.³⁶

2.2. THE AVAILABLE ARTIFICIAL INTELLIGENCE TECHNOLOGIES IN HEALTHCARE

Currently, artificial intelligence technology is being applied within various positions of the healthcare sector. Some examples of the applications of artificial intelligence technology are set out below.

2.2.1. Machine learning and deep learning

Machine learning is the most developed and commonly used artificial intelligence technology system in the healthcare sector.³⁷ With machine learning, data is collected, used to teach the algorithm, then the artificial intelligence is evaluated to see how well it uses the learned information.³⁸ Through this process, learning could either be supervised, where a person takes the time to teach the data to the artificial intelligence, or it could be unsupervised where a large volume of data is collected and uploaded onto the artificial intelligence system.³⁹ Historically, supervised learning, consists of a collection of input data with the corresponding output data, which is fed to the artificial intelligence system, allowing the artificial intelligence technology to learn that such input data is connected to the corresponding output data.⁴⁰ Overall, artificial intelligence learns what the answer should be when given a certain amount of information and when asked a related question, it could successfully provide that answer.⁴¹ Whereas with

³⁵ Ibid.

³⁶ Ibid.

³⁷ Chen & Decary *op cit* note 18.

³⁸ S L J Johnson 'AI and Machine Learning in Medicine: Ethical Considerations' (2020) 39(4) *Journal of Legal Medicine*.

³⁹ Ibid.

⁴⁰ K Yu, A L Beam, & I S Kohane 'Artificial Intelligence in Healthcare' (2018) 2 *Nature Biomedical Engineering*, p 719.

⁴¹ Ibid.

unsupervised learning, the artificial intelligence technology would be able to identify any obscure pieces of data.⁴²

As noted in *Rani et al*,⁴³ machine learning can notice within data and continuously improve on the outcome without much human intervention and programming, thus it is largely used in analysing data and making predictions.

Deep learning can be defined as artificial intelligence technology that learns from data and does not rely on instructions from humans. It is able to learn through using the information provided to detect anomalies, understand complex data, and predict outcomes.⁴⁴ It is noted that the concept of deep learning refers to artificial intelligence technology which is trained on large amounts of data.⁴⁵

2.2.2. Medical image diagnosis

As provided by some authors,⁴⁶ medical image diagnosis covers various aspects of the medical field such as radiology and dermatology. In radiology, medical images are captured through technologies such as an x-ray radiography or magnetic resonance imaging (MRI), which then assist in the accurate diagnosis of a patient, as well as keep track of the patient's progress when it comes to treatment for an illness.⁴⁷ Within the field of dermatology, a deep learning algorithm was developed to the point of being able to provide an accurate diagnosis of skin malignancy.⁴⁸

2.2.3. Management of medical records

Managing data and medical records of patients is the most important job within the healthcare system, however it is also one of the most time consuming for medical professionals, who could use the time and spend it with taking care of patients.⁴⁹ Usage of artificial intelligence technology, in this regard, helps to improve accuracy and efficiency of diagnosis and treatment

⁴² Ibid, p720.

⁴³ S Rani et al 'The Potential Application of Artificial Intelligence in Healthcare and Hospitals' (2023) 53 *ITM Web of Conferences*. <https://doi.org/10.1051/itmconf/20235301005>.

⁴⁴ Rani et al *op cit* note 42.

⁴⁵ Yu et al *op cit* note 39, p720.

⁴⁶ Ibid, p 722.

⁴⁷ Ibid.

⁴⁸ Ibid p723.

⁴⁹ Sharma *op cit* note 12.

suggestions.⁵⁰ It allows for medical practitioners to easily access patient information and reduces the amount of paperwork that practitioners would have to go through and analyse, thus reducing administrative costs and allowing for practitioners to attend to patients for longer rather than spending most of their time dealing with administration.⁵¹

2.2.4. Uses in clinical trials

*Shaheen*⁵² describes a clinical trial as a procedure where new treatments are given to consenting patients, as a test to see whether it is effective. Artificial intelligence allows for most tasks, such as monitoring patients etcetera, to be automated, instead of the researchers having to expend energy on doing so.⁵³ This allows for medical practitioners to spend more time on developing treatments, furthermore there is the added security of knowing that there will be a reduction in human error when it comes to diagnosis.⁵⁴

With the usage of artificial intelligence in clinical trials, the duration of these lengthy trials could shorten, whilst simultaneously increasing productivity.⁵⁵ *Rani* notes that artificial intelligence technology would track and monitor the overall health of patients, whilst also analysing data collected from the clinical trial and using this information to understand the disease for which the clinical trial was intended.⁵⁶

2.3 THE POTENTIAL OF ARTIFICIAL INTELLIGENCE IN HEALTHCARE

When discussing the potential of artificial intelligence and its application within healthcare, one should consider the existing challenges faced by current healthcare systems. Some of these issues include the high cost of medical fees, medical professionals being overworked, as well

⁵⁰ *Rani op cit* note 42.

⁵¹ *Ibid.*

⁵² M Y Shaheen 'Applications of Artificial Intelligence (AI) in Healthcare: A Review' (2021). doi:[10.14293/S2199-1006.1.SOR-PPVRY8K.v1](https://doi.org/10.14293/S2199-1006.1.SOR-PPVRY8K.v1)

⁵³ C Morgan 'AI in Clinical Trials: How AI can be used to Speed up the Clinical Trial Process' (MRL) available at <https://www.mrlcg.com/resources/blog/ai-in-clinical-trials--how-ai-can-be-used-to-speed-up-the-clinical-trial-process/#:~:text=Role%20of%20AI%20in%20Clinical%20Trials&text=For%20example%2C%20AI%20can%20be,potential%20side%20effects%20more%20quickly> accessed 4 November 2023.

⁵⁴ *Ibid.*

⁵⁵ *Shaheen op cit* note 51, p 4.

⁵⁶ *Rani op cit* note 42.

as needing to accurately analyse and process data to ensure that medical professionals can provide the best care to patients.⁵⁷

The usage of artificial intelligence technology has a lot of potential for future use within healthcare systems, as it has plenty of benefits which stem from its ability to take in a large quantity of data, accurately process and learn from the information, followed by accurate predictions of outcomes.⁵⁸ This results in efficient and accurate predictions which could be very useful in terms of reducing the cost of medical fees as the data of a patient is being captured, stored and followed at an efficient rate, which means that there is one less thing for the medical professional to worry about as they would not have to spend extra hours keeping track of this information. It is also useful in terms of easing the workload for medical professionals allowing medical professionals more time to spend with patients without having to deal with copious amounts of paperwork. Thus, they are less likely to suffer from a burnout and would be able to provide better patient care.⁵⁹

2.4. THE CURRENT LEGAL AND ETHICAL FRAMEWORK

2.4.1. Ethical principles proposed by the WHO

In 2021, the WHO proposed six foundational ethical principles that should be involved when enacting legislation that will regulate the developments of artificial intelligence and its usage all over the world.⁶⁰

The first principle is to protect *autonomy*. In this regard, autonomy is in reference to patient autonomy. This means that the medical practitioners and patients who are in contact with and are using artificial intelligence in healthcare must be in control, as such, artificial intelligence technology must be developed in a way that does not infringe on core human rights.⁶¹ With the protection of autonomy, the human right to privacy, confidentiality and informed consent must also be respected.⁶² This is to ensure that the personal data of a patient which is collected and stored, by the artificial intelligence technology, is not made public. Having data protection laws

⁵⁷ Sharma *op cit* note 12.

⁵⁸ Z Wen & H Huang 'The Potential for Artificial Intelligence in Healthcare' (2022) 27(4) *Journal of Commercial Biotechnology*. DOI: 10.5912/jcb1327.

⁵⁹ *Ibid*.

⁶⁰ World Health Organization *op cit* note 29.

⁶¹ *Ibid* 25-26.

⁶² *Ibid* 26.

is integral when it comes to implementing artificial intelligence machine learning technology, as machine learning algorithms use the personal information of patients to make a diagnosis and create treatments.⁶³

In South Africa, the Protection of Personal Information Act 4 of 2013 protects the personal information, or personal data, of data subjects; also known as research participants or patients; giving effect to and protecting the constitutional right to privacy found in section 12.⁶⁴ The second principle relates to the *promotion of human safety, well-being, and public safety*. In this regard, artificial intelligence technology should not pose a threat to human beings.⁶⁵

The third principle involves *transparency*. All information about the artificial intelligence technology must be made available before it is to be implemented in healthcare systems all over the world, which is important because it ensures that healthcare providers have all of the necessary information about artificial intelligence technology and can make informed decision regarding the extent to which it will be used within the healthcare sector.⁶⁶ The fourth principle requires the *use of artificial intelligence technology to foster responsibility and accountability*. Responsibility occurs in the development stage of artificial intelligence technologies, where it constantly being tested and evaluated by healthcare professionals, making sure that the algorithm works in a way that ensure the effectiveness of artificial intelligence within a hospital environment.⁶⁷ Accountability relates to who would be responsible when artificial intelligence leads to a patient being harmed, by way of ineffective diagnosis or treatment.⁶⁸ It is suggested that when it comes to these principles, countries should enact laws that would give effect to these principles and allow for a way to provide redress to affected patients in these scenarios.⁶⁹ Such regulations could involve a model where everybody involved in developing and deploying artificial intelligence technology within healthcare is responsible for any mistakes made by artificial intelligence.⁷⁰ The fifth principle is to ensure that artificial intelligence technology is *inclusive and effective*. To be inclusive, artificial intelligence should be developed in a way that allows for equitable use and access, thus the developer should be aware of any

⁶³ Ibid

⁶⁴ Government of South Africa. The Constitution of the Republic of South Africa, 1996.

⁶⁵ World Health Organization *op cit* note 29, p26.

⁶⁶ Ibid, p26-27.

⁶⁷ Ibid, p27.

⁶⁸ Ibid.

⁶⁹ Ibid.

⁷⁰ Ibid.

potential bias and take steps to avoid it.⁷¹ The final principle involves promoting artificial intelligence that is *responsive and sustainable*. Thus, developers should constantly train and evaluate artificial intelligence to ensure that the technology works in a way that produces an appropriate response.⁷²

2.4.2. Ethical principles put forth by scholars

*Naidoo et al*⁷³ notes that although scholars often differ when it comes to creating a framework which would be used to govern the usage of artificial intelligence technology in healthcare, there are five principles which are most commonly recognised as being integral in creating this framework.

These principles are referred to as a “normative core”, in that they are the most consistent in terms of their concept.⁷⁴ To summarize, the principles include firstly transparency, which means that the artificial intelligence must be developed in a way which allows for disclosure to a person who would be overseeing this development and progress of the technology. Secondly is justice and fairness, where the aim is to ensure that there is no discrimination or bias towards people within society. Third is responsibility and accountability, which aims at ensuring that there are provisions specifying who would be responsible for the usage of the technology within healthcare. Fourth is privacy, which looks to ensure that the personal information of the patient is kept confidential. Fifthly is non-maleficence, which promotes the safety of a patient when using the artificial intelligence technologies found in healthcare.

2.4.3. Legal framework in South Africa

As in *Obasa and Palk*,⁷⁵ when it comes to a legal framework, the Protection of Personal Information Act in South Africa, regulates the collection, processing, and distribution of personal information of citizens, within the promotion of the Constitution of the Republic of South Africa, 1996. For artificial intelligence to work effectively within the healthcare system,

⁷¹ Ibid, p29.

⁷² Ibid, p30.

⁷³ Naidoo et al op cit note 1.

⁷⁴ Ibid, p12

⁷⁵ A E Obasa & A C Palk ‘Responsible Application of Artificial Intelligence in Healthcare’ (2023) 119(5/6) S Afr J Sci.

it would need access to personal information of patients, permission from patients to do so, and would need to be able to process this information to ascertain a diagnosis and recommend a treatment most suited for the patient. The article also noted that the aforementioned Act does not set out provisions that would account for the unique application of artificial intelligence technology in health care.

It is suggested that the ethical principles provided by WHO set out some of the most important considerations that need to be addressed as further developments are being made in artificial intelligence. However, broad ethical principles alone, cannot be used to govern the usage of artificial intelligence technology in healthcare systems all over the world, rather it could be used as guiding principles for the enactment of laws that will govern the usage of artificial intelligence within healthcare in a country.

2.5. ISSUES IN APPLYING ARTIFICIAL INTELLIGENCE TECHNOLOGY IN HEALTHCARE IN AFRICAN COUNTRIES

*Owoyemi et al*⁷⁶ provided a discussion of a few issues which have an impact of the application of artificial intelligence technology within the healthcare systems of African countries. The authors highlighted a few issues. These issues include, firstly there are data quality issues, secondly is the policy issue, thirdly is the infrastructure, and lastly is the issue surrounding the cost of applying the artificial intelligence technology. Firstly, the data quality issues stem from the fact that artificial intelligence technology used within healthcare sectors are often made in developed nations, thus the algorithm is trained on data which comes from those developed nation.⁷⁷ As such the data used in training comes from a population which differs greatly in comparison to populations found within African countries, thus there will be disparities found in terms of the performance of the artificial intelligence technologies within healthcare sectors of these countries.⁷⁸ The second issue is in regard to policies enacted to govern artificial intelligence technologies within healthcare. Currently, the issue is that there is no legislation which can be turned to when it comes to determining who would be responsible, should the artificial intelligence technology fail to the point of a patient being misdiagnosed, or given insufficient treatment.⁷⁹ It is submitted that since there is no regulations for artificial

⁷⁶ *Owoyemi et al op cit* note 9.

⁷⁷ *Ibid.*

⁷⁸ *Ibid.*

⁷⁹ *Ibid.*

intelligence technology used in healthcare, there is no security provided to the patient in terms of being assured that such technology which is being used could be trusted. As is discussed in Chapter 3, a regulatory framework that is put in place for artificial intelligence technology, should be made within the context of African countries. Thirdly is the issue of a lack of adequate infrastructure. This refers to the lack of resources in the form of electricity and effective internet, which hinder the development of artificial intelligence technology in many African countries.⁸⁰

2.6. BIGGEST CRITIQUE OF ARTIFICIAL INTELLIGENCE TECHNOLOGY IN HEALTHCARE

As illustrated above, for the usage of artificial intelligence technology in healthcare to effectively work, massive amounts of personal information of patients would need to be collected and used to train algorithms which will eventually progress to making diagnoses and determining effective treatments. Thus, the biggest challenge standing in the way of achieving this ultimate goal, involves the *bias* found in the algorithm.

Bias found in artificial intelligence can be seen as something that occurs when the data which is used to train an algorithm is not diverse enough to produce appropriate and accurate predictions.⁸¹ Artificial intelligence systems rely heavily on the collections of data that are used in training it, this data is collected from the population and will be used when diagnosing a patient and recommending a treatment.⁸² As stated in *Owoyemi et al*,⁸³ the algorithm makes the artificial intelligence technology, thus there is a probability that the artificial intelligence will display bias in favour of the data that was used when it was trained.

It is submitted that the danger arises when this data that is used in training the technology, comes from a more homogenous dataset. This issue is particularly troubling because the health care system deals with citizens who are in their most vulnerable state, thus any method or technology used to regulate the implementation and usage of artificial intelligence needs to be

⁸⁰ Ibid.

⁸¹ D O Eke et al *Responsible AI in Africa* (2023) 39.

⁸² S Gerke et al 'Ethical and Legal Challenges of Artificial Intelligence-driven Healthcare', In, *Artificial Intelligence in Healthcare*.

⁸³ Owoyemi et al *op cit* note 9.

sensitive to; and accommodate; the uniqueness of the experience of members within different communities all over the world.

Most of the developments of artificial intelligence technology used in healthcare have been done in Western and European countries, thus the algorithm used to train artificial intelligence has a bias in favour of those countries, effectively ignoring the unique experiences that occur in non-Western and non-European countries.⁸⁴ Although algorithm bias is regarded as a global issue, scholars have expressed that it has a more significant impact within African countries.⁸⁵ *Owoyemi et al* posit that this is due to the unique physiologies of people from African countries.⁸⁶

In the ethical principles discussed above, the WHO suggested the principle of inclusivity, which means that developers must ensure that the data used to train artificial intelligence algorithms are diverse, to avoid potential bias.⁸⁷

2.7. CONCLUSION

This chapter set out to define artificial intelligence and illustrated the history behind the usage of artificial intelligence within the healthcare sector. This was followed by an insight into the current applications of artificial intelligence within healthcare, as well as the potential of artificial intelligence in healthcare.

Next was a broad explanation of the ethical framework provided by the WHO and the legal framework surrounding the usage of artificial intelligence in healthcare within South Africa. It was noted that there is still a lack of such a necessary regulatory framework, as such, there is no indication as to who would take accountability when a patient is harmed as a result of an artificial intelligence system causing harm to the patient.

Finally, this chapter illustrated a few criticisms from scholars regarding the regulation and usage of artificial intelligence within healthcare systems.

Artificial intelligence is defined as a computer-based system capable of human intelligence. Over the course of history artificial intelligence technology has proven to be valuable when it

⁸⁴ Eke et al *op cit* note 80.

⁸⁵ Owoyemi et al *op cit* note 9.

⁸⁶ Ibid.

⁸⁷ World Health Organization *op cit* note 29, p29.

comes to the usage of this technology within healthcare. Currently, artificial intelligence technology is used in multiple areas of the healthcare sector, some of these include uses in medical trials, management of medical records, and machine learning. With all of these uses, artificial intelligence has the potential to make valuable improvements to healthcare systems, such as allowing for the accurate and efficient diagnosis and treatment of patients, thereby saving costs, and allowing for efficient patient care. The WHO introduced six ethical principles which would guide legislators in creating and enacting legislation that would regulate the development, usage, and promotion of artificial intelligence technology within healthcare.

The following chapter will discuss bioethics and its importance to the frameworks used in regulating the applications of artificial intelligence technology within healthcare.

CHAPTER THREE

BIOETHICS

3.1. INTRODUCTION

The previous chapter set out the current view of artificial intelligence that is used within healthcare, the potential of artificial intelligence, as well as the future that is to come, with regard to the development, implementation, and usage of artificial intelligence technology within the healthcare sector. As was noted, it is established that machine learning algorithms, continue to play a key role in terms of the usage of this technology within healthcare. However, there was acknowledgement that machine learning is not perfect, as it is likely that the technology could learn to behave in a biased manner towards developing nations which do not develop the technology and would have a more diverse population in comparison to the developed nations who develop the artificial intelligence which is used within healthcare. In relation to this, comes the evident danger of there being a lack of legal and ethical frameworks which could govern the development, implementation, and usage of this technology. When scholars are developing such frameworks, they look to the bioethical principles, which have more or less been recognised on a global scale.

This chapter discusses the concept of bioethics, more specifically the western perspective on ethics, also known as western bioethics. In doing so, there will be a broad overview of bioethics, as well as the fundamental bioethical principles. Furthermore, this chapter will briefly discuss the concept of global bioethics, followed by one of the common limitations noted by scholars, regarding the implementation of these principles.

Furthermore, this chapter sets out the concept of western bioethics principles, which are being considered by scholars as they create legal and ethical frameworks to govern the usage of artificial intelligence technology in healthcare. This is followed by a submission that when it comes to creating such frameworks on a global scale, or more specifically those which would be commonly implemented throughout the African continent, there needs to be more inclusion in terms of the perspectives through which bioethical principles are viewed and implemented.

3.2. OVERVIEW OF BIOETHICS

Ethics as defined in *Varkey*,⁸⁸ specifies that it refers to the morality of decisions made in solving an issue. Essentially, ethics provides guidance on how people should be treated.⁸⁹

The concept of 'bioethics' that is commonly known today, may be taken to have originated in the United States. The term 'bioethics' originated from the views of V R Potter in 1962 during a lecture at South Dakota State University, Potter was referred to as the 'father of bioethics', as he proposed a discipline that would essentially be a guide for the questions surrounding the "future of mankind".⁹⁰ It has been submitted that bioethics was initially a ponderance of how ethics and biological science interrelate.⁹¹ However, this discipline is currently viewed as a broad interdisciplinary debate regarding morality within religion, science, medicine, etcetera.⁹² There are many different definitions that have been put forth for the term 'bioethics'.⁹³ A very wide definition would view the term as a determination of morality in terms of deciding on science and health.⁹⁴ Medical ethics, environmental ethics, and public health ethics are all encompassed within bioethics.⁹⁵ Firstly, medical ethics is a focus on issues within health research, as well as health care ethics. Secondly, environmental ethics is a focus on the relationship between human conduct and its impact on the environment. Lastly, public health ethics focuses on concerns surrounding public health.⁹⁶ It should be noted that bioethics also includes social ethics. Social ethics focuses on the issues that arise in the disparity between the privileged portion of the population, as well as the less privileged portion of the population.⁹⁷

As provided by *Segota*,⁹⁸ Potter's ultimate vision was for bioethics to be an interdisciplinary practice in which ethical principles are intercultural, and work in conjunction with responsibility as well as humility. This is to ensure that there is a broadening in terms of the aptitude that humans have for humanity and making morally acceptable decisions. However,

⁸⁸ B Varkey 'Principles of Clinical Ethics and Their Application to Practice' (2021) 30 *Med Princ Pract*.

⁸⁹ J P Olejarczyk & M Young 'Patient Rights and Ethics' (Stat Pearls), available at <https://www.ncbi.nlm.nih.gov/books/NBK538279/>, accessed 12 November 2023.

⁹⁰ I Segota 'Global Bioethics and Potter's Criticisms of the Concept of Human Progress', (2000) 1(1) *Taiwan yi xue ren wen xue kan*, 36-55.

⁹¹ Segota *op cit* note 89, p36

⁹² *Ibid*.

⁹³ D E Helland *What is Bioethics?* In Nordic Committee on Bioethics 'Teaching Bioethics' (2002) 2 *NORD* 12-13.

⁹⁴ *Ibid*.

⁹⁵ D B Resnik 'Research: Bioethics' available at

<https://www.niehs.nih.gov/research/resources/bioethics/index.cfm#:~:text=Bioethics%20is%20the%20study%20of,in%20biomedicine%20and%20biomedical%20research>, accessed 06 October 2023.

⁹⁶ *Ibid*.

⁹⁷ Segota *op cit* note 89.

⁹⁸ Segota *op cit* note 89, p50.

as acknowledged by some authors,⁹⁹ many scholars, familiar with the discipline of bioethics, have commented that bioethics is viewed as ‘Western.’ This is due to bias found within the idea of being colour-blind when applying ethical principles, irrespective of the varying history and culture found within each country.¹⁰⁰ This is to say that the way in which bioethics was implemented did not provide for much inclusion and uniqueness, choosing instead to stick to a Western perspective, viewing this as a standard.

*Weingarten*¹⁰¹ suggests that bioethics is centred around the Western perspective on ethics. The reasoning for this inferred that since the medical field largely encompasses western medicinal practices, there is an understanding that the ethical principles put forth to assist in issues which arise within the medical field, would be more inclined to the interpretation provided by the Western perspective.¹⁰²

*Chattopadhyay and De Vries*¹⁰³ provided that the main reason as to why there is a term such as Western bioethics, deals with the fact that the structure of the ethical principles comes from the consideration of Western views on morality. Based on the article by *Orfali*,¹⁰⁴ the American perspective on ethics has been unofficially accepted as the basis for ethical frameworks, on a global scale, however there is also an understanding that although these principles are worthwhile, there must be space for an inclusion of ethical principles which fill up the space with relevant perspectives on ethics, within each country.

It is submitted that viewing the Western perspective of ethics as being a global standard is contradictory to the Potter’s initial vision for bioethics. Potter was interested in allowing for interdisciplinary and intercultural views, to be respected and included, so as to ensure that bioethics can be effectively implemented within each country. Thus, it could be inferred that ignoring this inclusion of diverse cultural views and implementing set ethical principles within a country with a more diverse population, would be counterproductive in that the framework created would basically be useless given the fact that this country would ordinarily view morality differently. Furthermore, this perspective of bioethics contradicts his ideas of a discipline that is constantly evolving.

⁹⁹ Chattopadhyay & De Vries *op cit* note 9.

¹⁰⁰ *Ibid.*

¹⁰¹ M Weingarten ‘Bioethics as a Western Culture-Bound Syndrome’ (2011) 16(3) *The European Legacy*.

¹⁰² *Ibid.*

¹⁰³ Chattopadhyay & De Vries *op cit* note 9.

¹⁰⁴ K Orfali ‘A Journey Through Global Bioethics’ (2019) 16 *Bioethical Inquiry*.

3.3. FUNDAMENTAL PRINCIPLES

As provided by *Gillon*,¹⁰⁵ Western bioethics has four fundamental principles. As set out in the following paragraphs, these principles are beneficence, non-maleficence, respect for autonomy, and justice.

3.3.1. Beneficence and non-maleficence

First is the principle of beneficence which often works with the second principle of non-maleficence. There are some authors which suggest that the overall goal of these two principles is to ensure that the patient or participant is provided with the utmost care and protection.¹⁰⁶ This entails making sure that the patient or participant would suffer as little harm as possible. Some authors reiterate that the principle of beneficence looks to ensure that the patient is safe and being provided good care, through placing an obligation on the medical practitioner which requires them to rescue patients, take measures to prevent harm, and overall provide good care and help to the patient.¹⁰⁷ In addition to this, the medical practitioner must ensure that they promote the wellness of their patients.¹⁰⁸ When it comes to the principle of non-maleficence, *Varkey*¹⁰⁹ finds that the medical practitioner is obligated to ensure that they do not harm a patient in any way, whether it be through the deprivation of way of life, inflicting pain, or killing a patient.

3.3.2. Respect for autonomy

Next is the principle of respect for autonomy. Autonomy refers to the ability that a person has to make their own decisions regarding their body. Having respect for autonomy places a moral obligation on medical professionals, researchers, etcetera, to adhere to this principle -they would be morally obligated to respect the views of their patients or research participants. *Varkey*¹¹⁰ provides that the principle of autonomy places an obligation on the medical practitioner to give the patient all information regarding their treatment and condition.

¹⁰⁵ R Gillon 'Medical Ethics: Four Principles Plus Attention to Scope' (1994) 309 *BMJ* 184-186.

¹⁰⁶ *Ibid.*

¹⁰⁷ *Varkey op cit* note 87, p18.

¹⁰⁸ *Ibid.*

¹⁰⁹ *Ibid.*

¹¹⁰ *Ibid.*, p19.

As acknowledged in *Farhud and Zokaei*,¹¹¹ working in hand with the principle of autonomy is the concept of informed consent. Informed consent involves the medical practitioner telling the patient all of the facts of their illness and treatment options which would require them to give permission for the medical practitioner to implement the treatment plan. In order to allow for the patient to make an informed decision, it is important that the medical practitioner tell them everything that will be done, this includes the medication, the procedures, and the care that they would receive after any potential surgery.¹¹² *Varkey*¹¹³ provides a few requirements which must be fulfilled in order for the patient to give informed consent to a treatment. Firstly, the patient must be able to comprehend all of the information, regarding the treatment and the risks, secondly it is important that the information provided by the medical practitioner is complete and accurate, thirdly the patient is not deciding whilst under any influence nor are they deciding whilst in danger, and fourthly the patient consented to the treatment or procedure.¹¹⁴

It is submitted that the most important thing is for the patient to be made aware of all risks involved in the treatment and once it is clear that the patient understands, then they will be able to decide on whether to give permission for the treatment or to refuse the treatment.

In adhering to this principle, these medical and scientific professionals would have to inform people of the treatment or testing that will be done, so that the people can make an informed decision. Another aspect of this obligation would be for the medical and scientific professionals to maintain the confidentiality of these patients and participants.¹¹⁵ This is to ensure that the person feels safe in knowing that their personal information will not be spread.

3.3.3. Justice

Justice is the final fundamental principle. Justice is viewed as being a moral obligation to act fairly, in terms of distributing resources, respecting rights; this includes respecting morally

¹¹¹ D D Farhud & S Zokaei 'Ethical Issues of Artificial Intelligence in Medicine and Healthcare' (2021) 50(11) *Iran J Public Health*.

¹¹² *Ibid*.

¹¹³ *Varkey op cit* note 87, p19.

¹¹⁴ *Ibid*.

¹¹⁵ *Gillon op cit* note 104.

acceptable rights.¹¹⁶ In doing so, it is important that medical practitioners ensure that there is no patient who is treated unfairly or placed in a disadvantageous position.¹¹⁷

As in *Olejarczyk and Young*,¹¹⁸ distributive justice is found under the concept of justice and looks to ensuring that there is no favouritism amongst patients, in that everyone is treated the same, and given the same high standard of care. More specifically, medical practitioners are obligated to ensure that they treat all patients the same, furthermore, some countries provide legislation which specifies this principle of distributive justice.¹¹⁹

3.4. GLOBAL BIOETHICS

In addition to coining the term ‘bioethics’, Potter also made the first proposal of *global bioethics*.¹²⁰ Before coming up with this concept of ‘global bioethics’, he suggested a ‘bridge bioethics’, which was a term used to describe how the advent of bioethics would connect science with ethics -this was to say that bioethics is what connects the different disciplines.¹²¹ The goal of global bioethics was for different countries to be in cooperation to solve global issues.¹²² As reiterated by *Macpherson*,¹²³ the hope with global bioethics was for there to be a discipline where biological knowledge is used to develop solutions to global issues. Still, it is submitted that there is a lot of discourse surrounding global bioethics.

As provided by some scholars, there is no question that bioethics is a global concern, however, the bioethics that scholars appear to favour is the idea of solving concerns, such as issues surrounding implementing new technologies; within each country, using a largely Western perspective on ethics.¹²⁴

Scholars have been unable to assign a specified definition for the concept of global bioethics, as there is a lot of inquiry into whether there can be a universal set of principles. *Holm and Williams-Jones*¹²⁵ noted that global bioethics is either viewed as a method of globalizing

¹¹⁶ Ibid.

¹¹⁷ ‘Medical Ethics: Justice’ (The Medic Portal) available at <https://www.themedicportal.com/application-guide/medical-school-interview/medical-ethics/justice/>, accessed 12 November 2023.

¹¹⁸ Olejarczyk and Young *op cit* note 88.

¹¹⁹ Ibid.

¹²⁰ Segota *op cit* note 89, p36.

¹²¹ Ibid.

¹²² G Ortiz-Millan ‘Bioethics, Globalization and Pandemics’ (2022) 33 (1) *Global Bioethics*.

¹²³ C Macpherson ‘Global Bioethics: It’s Past and Future’ (2022) 33(1) *Global Bioethics*.

¹²⁴ Chattopadhyay & De Vries *op cit* note 9.

¹²⁵ S Holm & B Williams-Jones ‘Global Bioethics -Myth or Reality?’ (2006) 7(10) *BMC Medical Ethics*.

bioethical issues, or a universal set of bioethics principles, or it is viewed as an universal inquiry into bioethics. In terms of establishing a global bioethics, there is an understanding that there would need to be no diversity in terms of schooling, books, thought processes etcetera, all over the worlds, which is highly unrealistic.¹²⁶ The idea behind this analogy was that in order for something to be unified, there needs to be complete unity in all other aspects of life in every part of the world.¹²⁷

Some authors maintain that there cannot truly be a ‘global bioethics’, in terms of a universal set of ethical principles.¹²⁸ This is due to the fact that the various countries, all around the world are not living through a single experience. Each society has its unique views on morality, as well as the differing norms, cultures, and histories. One such example of differing cultures and ethical perspectives which was highlighted by *Chukwuneke et al*,¹²⁹ involved the practice of circumcision within the societies of multiple African countries, such as in South Africa; where it is common and viewed as a right of passage into adulthood, however, in Western culture, the practice of circumcision would be frowned upon and viewed as being unethical. All of this was to support the notion that there cannot currently be a truly global bioethics, as each country has different views on what would be considered ethical.¹³⁰ Thus, in order to improve this view of global bioethics, it is necessary for scholars to look to the different cultures, history, and norms which can be found within a country, when it comes to creating policy frameworks which would be implemented within said country.¹³¹

3.5. A CRITIQUE OF BIOETHICS

On the concept of Western bioethics, there has been a major critiqued. As accurately noted by *Chattopadhyay and De Vries*,¹³² bioethics views all ethical issues around the world, in relation to Western norms. Thus, the solutions suggested would be largely Western in nature, irrespective of where that ethical solution is needed. Overall, the major limitation is found in the lack of acknowledgement shown towards the diverse cultures and histories found within

¹²⁶ Ibid.

¹²⁷ Ibid.

¹²⁸ F N Chukwuneke et al ‘Global Bioethics and Culture in a Pluralistic World: How Does Culture Influence Bioethics in Africa?’ (2014) 4 *Ann Med Health Sci Res*.

¹²⁹ Ibid.

¹³⁰ Ibid.

¹³¹ Ibid.

¹³² Ibid.

different countries.¹³³ It is submitted that using Western bioethics as a standard for ethics that would be implemented all over the world, would be unrealistic. A way forward, in terms of inclusivity, would be for scholars to expand on the teachings of bioethics, moving away from the rigid implementation of principles within different countries.¹³⁴ With this expansion in terms of creating ethical frameworks, there should be a focus on the incorporation of the culture, history and norms, that encompass the unique perspectives of each country. Thus, it is further submitted that, scholars should look to an African perspective on ethics when creating an appropriate regulatory framework for artificial intelligence technology used within African countries.

3.6. CONCLUSION

This chapter briefly discussed the concept of bioethics, the fundamental principles of bioethics, as well as the limitations which emerge in trying to implement bioethics, which contains largely western views and norms, within the context of different communities.

Bioethics, as a concept is very valuable in terms of the amount of awareness which it brings, regarding ethical questions, as well as in the provision of ethical solutions. However, as was previously acknowledged, the interpretations of bioethical principles are largely based on a western view on ethics, with little room for inclusivity in terms of the perspectives found within different countries. Furthermore, in considering the concept of global bioethics, it is submitted that in order for this concept to be effective there would need to be one way of thinking all throughout the world, since this does not exist then it would be difficult to have global bioethics. Each country has its own views on morality, thus hypothetically, in order for there to be effective global bioethics, and in keeping with the view which Potter had for this concept, there would need to be a consideration of each countries' own view of morality. In the spirit of inclusion, it is submitted that as a way forward, in terms of using an ethics guideline when creating a framework that would be used to regulate the usage of artificial intelligence technology within the healthcare systems of African countries, it is important that there is a focus on the African perspective of ethics. The following chapter further elaborates on the African perspective of ethics.

¹³³ Ibid.

¹³⁴ Chattopadhyay & De Vries *op cit* note 9.

CHAPTER FOUR

AFRICAN BIOETHICS

4.1. INTRODUCTION

The previous chapter provided a brief insight into the concept of bioethics. Western perspective of ethics, also known as Western bioethics or bioethics, provided a perspective on the four fundamental bioethical principles. This perspective on ethics is the specified one which were to be considered when scholars sought to create a framework that would be used to regulate the development, implementation, and usage of artificial intelligence technology within healthcare systems. These principles include the principle of autonomy, beneficence, non-maleficence, and justice.

Western bioethics prioritizes the perspective on ethics as one which largely focuses on the wellness and safety of the individual, with not as much consideration to the community within which that individual lives. This perspective is unique to the West and since there are many different countries, with diverse cultures, histories, and norms; many of which do not view ethics as a means which is solely dedicated to benefitting the individual, it stands to reason that applying the Western perspective on ethics would not be effective as this perspective is not sensitive to the actual culture and norms which are unique to the non-Western country.

In this chapter, it is submitted that an African perspective on ethics is appropriate when creating a legal and ethical framework to regulate the development and usage of artificial intelligence technologies within healthcare, in African countries. Though there are various African countries, each with its own perspectives on ethics, as influenced by the history, culture and societal norms, given how many different African countries view morality, there is a core concept which rings true for most African countries. This concept allows for the ethical perspective to focus on the good of the community as a whole, so as to ensure that there is no harm done to the community.

This chapter will support the notion that scholars should be looking to the teachings of African bioethics when it comes to creating a framework to regulate artificial intelligence technology within healthcare.

4.1.1. Overview

As noted by *Donnelly*,¹³⁵ artificial intelligence technology will present tremendous advantages for African countries. Such advantages include, addressing any lack of access to healthcare, allowing for advances to be made within healthcare policies.¹³⁶

Thus, it is submitted that the implementation and usage of artificial intelligence technologies within African countries is inevitable and the potential of this usage of artificial intelligence is boundless. As a result, it is further submitted that, to ensure the safety of patients and healthcare professionals who would be interacting with artificial intelligence technology, it is necessary for there to be ethical and legal frameworks in place which would regulate the development of, as well as implementation and usage of, artificial intelligence within healthcare.

Scholars, such as *Barugahare*,¹³⁷ have acknowledged that the current bioethical framework that is globally recognised, this would be Western bioethics, does not present many considerations from African perspectives on ethics.

As acknowledged by *Behrens*,¹³⁸ in order for people to be receptive to the teachings of an ethical framework, the principles; as well as the perspective, which is used to understand them, must reflect what is familiar to the community. Thus, there is a need for an African perspective on ethical principles. If people resonate with the ethical principles then they are more likely to conduct themselves in accordance with the framework.

This demonstrates the need for a perspective on ethics, unique to the country within which the ethical framework would be implemented. Thus, as scholars are looking to create an ethical and legal framework which would regulate the development, usage, and implementation of artificial intelligence technology within the healthcare systems of African countries, it is submitted that they need to look to the African perspective on ethics.

4.2. AFRICAN BIOETHICS IS INTEGRAL IN CREATING A LEGAL AND ETHICAL FRAMEWORK TO REGULATE THE USAGE OF ARTIFICIAL INTELLIGENCE TECHNOLOGY WITHIN HEALTHCARE

4.2.1. A brief background of ‘African Bioethics’

¹³⁵ D Donnelly ‘First Do No Harm: Legal Principles Regulating the Future of Artificial Intelligence in Health Care in South Africa’ (2022) 25 *PER/PELJ*, p 4.

¹³⁶ *Ibid.*

¹³⁷ J Barugahare ‘African Bioethics: Methodological Doubts and Insights’ (2018) 19(98) *BMC Medical Ethics*.

¹³⁸ K G Behrens ‘Towards an Indigenous African Bioethics’ (2013) 6(1) *SAJBL*.

Bioethics is a discipline which was continuously developed within the norms and perspectives of Western countries, most prevalent views come from the United States.¹³⁹ The advent of ‘global bioethics’, is largely concerned with bioethics being used as a blueprint for ethical frameworks. However, applying this largely Western perspective on ethics across Africa proves to be counterproductive. Following this, scholars have pointed out that this application of Western bioethics, within African countries would be seen as a modern form of colonialism, or neo-colonization.¹⁴⁰

*Tangwa*¹⁴¹ noted that the African philosophy discourse, which originated around the 1970s, deals with the argument, made by some scholars, that *there is no such thing as African philosophy*. Insisting that there is a lack of African philosophy means that there is no such thing as African thought, thus there is no need to consider an African perspective on ethical issues within medical research ethics.¹⁴²

Other scholars have correctly put forth that ignoring the fact that an African philosophy exists would mean disregarding the existence and various cultures of African people.¹⁴³ It was further noted that scholars should be reminded that generalizing thoughts surrounding ethics and morality would mean displaying ignorance towards the fact that there is no singular culture, norm or history, instead the world is made up of hundreds of countries each with its own culture, history and norm, thus each with unique views on morality and ethics.

African philosophy is defined as a way of critical thinking which stems from the culture, history, societal norms as well as political considerations within African countries.¹⁴⁴ This philosophy is the basis within which scholars have posited that African bioethics would be rooted in.

‘Decolonizing bioethics’ is a concept which asks scholars to consider a method of decolonizing the thoughts surrounding the applications of bioethics within African countries, through looking at indigenous African perspectives on ethics. With this, scholars would need to investigate the kinds of effects that using bioethics with foreign principles have on the regulatory frameworks and how they are implemented.¹⁴⁵

¹³⁹ A K Fayemi & O C Macaulay-Adeyelu ‘Decolonizing Bioethics in Africa’ (2016) 3(4) *BEOnline*.

¹⁴⁰ *Ibid*.

¹⁴¹ G B Tangwa ‘Giving Voice to African Thought in Medical Research Ethics’ (2017) 38 *Theor Med Bioeth*, p102.

¹⁴² *Ibid*.

¹⁴³ *Ibid*.

¹⁴⁴ *Ibid*.

¹⁴⁵ Fayemi & Macaulay-Adeyelu *op cit* note 138.

The initial idea of bioethics was to create an interdisciplinary and intercultural practice that could potentially unite countries. Even at its initial stage, Potter understood the need for bioethical frameworks to be inclusive as opposed to being a fixed set of principles that would forcibly be applied all over the world.¹⁴⁶ Such bioethics would be unrealistic and insensitive to each country, as the culture and norms of each country are what shape the public view of morality.¹⁴⁷

Ideally, scholars would want to apply the principles of bioethics on a global scale. However, realistically, this cannot be done.¹⁴⁸ The main reason for this is the fact that each country has its own unique perspective on morality, which was fashioned from the history of the country, the culture, and the norms found within society.¹⁴⁹ Thus, with the concept of decolonizing bioethics, scholars acknowledge that there is a need for more cultural sensitivity in terms of there being an ethical framework in place to work with that countries view on morality.¹⁵⁰

As accurately provided by some scholars,¹⁵¹ all societies have a duty to live in accordance with their moral values, which are often rooted in that society's unique cultural views. Thus, African societies should live in accordance with their own moral values stemming from cultural perspectives.¹⁵² As defined in an article, African bioethics is where ethical issues are coming up with the healthcare sector are evaluated in terms of the African perspective on ethics.¹⁵³

One of the leading concepts of African bioethics is the concept of Ubuntu. As by *Dignum*,¹⁵⁴ ubuntu teaches that a person is unbreakable as long as they have a good relationship with the community.

4.2.2. African perspective on ethics

¹⁴⁶ Segota *op cit* note 89.

¹⁴⁷ Ibid.

¹⁴⁸ Chukwuneke et al *op cit* note 127.

¹⁴⁹ Ibid.

¹⁵⁰ Fayemi & Macaulay-Adeyelu *op cit* note 138.

¹⁵¹ I A Kanu, 'African Bioethics in a World of Change' (2018) 1(2) *Journal of African Studies and Sustainable Development*, p53.

¹⁵² Ibid.

¹⁵³ I A Kanu 'Igwebuik as the Consummate Foundation of African Bioethical Principles' (2022) *SSRN*.

¹⁵⁴ V Dignum 'Responsible Artificial Intelligence: Recommendations and Lessons Learned', in D O Eke et al *Responsible AI in Africa: Challenges and Opportunities*, (Palgrave Macmillan, 2023).

African bioethics is different from Western bioethics in that the overall goal is to ensure the respect for, and safety of, the community.¹⁵⁵ As noted by *Chukwuneke et al*,¹⁵⁶ the African perspective on the four bioethical principles places emphasis on the sense of a person within a community and abiding by community standards.

The principle of autonomy is translated in the African perspective on ethics to focus on respect for community, which each person living within the community should have, thus the values and goals of the community are just as important as the values and goals of a single person.¹⁵⁷ Thus, as an alternative concept to that of autonomy, African bioethics suggests the principle of *solidarity*.¹⁵⁸ This perspective upholds the concept of *ubuntu*.

Some authors describe *ubuntu* as a term which is used, throughout Africa, and which views the person as inseparable from their community.¹⁵⁹ Thus, according to *ubuntu*, a person's conduct is viewed against the backdrop of how the community is impacted.

The principles of beneficence and non-maleficence often work together.¹⁶⁰ Overall, the African perspective on ethics aims to provide benefits for the population without causing any harm. Different African countries view situations differently, thus when acknowledging 'African bioethics', there cannot be a single ethical framework that would be viewed as African bioethics, rather African bioethics considers the one aspect that all African countries have in common, which is to promote the success and wellness of the community.¹⁶¹ Thus, when faced with bioethical dilemmas, such as the regulation of artificial intelligence within African countries in a way that is in line with the principles of beneficence and non-maleficence, the African bioethical framework is one which leaves room for the considerations of cultures, norms and moral perspectives of each African country. In this way, African countries could observe these principles of beneficence and non-maleficence, in a way that would be effective within their community.¹⁶²

¹⁵⁵ *Ibid* p674.

¹⁵⁶ *Chukwuneke et al op cit* note 127.

¹⁵⁷ *Ibid*.

¹⁵⁸ *Kanu op cit* note 152.

¹⁵⁹ N S Jecker & C Atuire 'Bioethics in Africa: A Contextually Enlightened Analysis of Three Cases' (2021) 22 *Developing World Bioeth*, p113-115.

¹⁶⁰ *Chukwuneke et al op cit* note 127.

¹⁶¹ *Ibid*.

¹⁶² *Ibid*.

Finally, an African perspective on the principle of justice looks to ensure that the overall goals for public health are being met.¹⁶³ Multiple authors have noted that the principle of justice works with the concept of fairness in order to promote equality and prevent bias which would arise due to the insufficient training provided to the artificial intelligence algorithm.¹⁶⁴

The African perspective can be surmised within the previously mentioned concept of ubuntu.¹⁶⁵ Ubuntu is a term which is widely known across the African continent, and since there is no exact definition for this term in English, it could be broadly interpreted as an ethical view which considers an individual to a person with the ability to make moral decisions once they are active and contributing to the community.¹⁶⁶ This means that as the person grows older and become more integrated within African society, they should be taking steps to ensure that there is harmony and overall wellness within their community.

4.2.3. A South African context

As noted by authors,¹⁶⁷ although applications of artificial intelligence technology look promising within African countries, there are no regulatory frameworks in place to govern the development, implementation, and usage of artificial intelligence technology within healthcare.

Currently, in South Africa, there are no laws which are in place to regulate the development, implementation, and usage of artificial intelligence technology within healthcare. Thus, it is suggested that as a G20 member state, South Africa should follow the G20 guide for principles which would regulate artificial intelligence technology in healthcare.¹⁶⁸

It has been submitted that when it comes to ethical perspectives, South Africa is in need of more scholars considering ethical issues through the African perspective.¹⁶⁹ This is due to the fact that there are mostly scholarly work, centred around an application of Western ethics in an African context, as opposed to providing an African perspective on ethics.¹⁷⁰ The overall reason for a shift in the perspective on ethics, is to fulfil the human right of dignity.¹⁷¹ The point of

¹⁶³ Ibid.

¹⁶⁴ Naidoo et al op cit note 1.

¹⁶⁵ Chukwuneke et al op cit note 127.

¹⁶⁶ Ibid.

¹⁶⁷ Donnelly *op cit* note 134.

¹⁶⁸ Ibid.

¹⁶⁹ Behrens *op cit* note 137.

¹⁷⁰ Ibid.

¹⁷¹ Ibid.

having an African perspective when viewing issues which are relevant within an African context is to ensure that there is no erasure in terms of the culture and norm found within an African country such as South Africa. The right to human dignity, as so enshrined within section ten of the Bill of Rights of The Constitution of the Republic of South Africa, 1996 affords everyone the right to be respected and to be treated with dignity.¹⁷² It is submitted that having this right enshrined as a constitutional value within South Africa, expresses the importance of this human right, thus in making a legal and ethical framework which will be used to regulate the usage of artificial intelligence technology in healthcare, policy makers need to make sure that the frameworks reflects such constitutional values such as the right to dignity.

African bioethics is relevant within the context of South Africa, as there is affinity with the concept of ubuntu. In South Africa, ubuntu is a concept which is part of the norm, as it stems from the history of the country. As provided by some authors,¹⁷³ following the abolishment of the apartheid regime, when policy makers were drafting the 1993 Interim Constitution, the concept was included as an important aspect which is integral in terms of being a way forward for a new democratic society. This is used to show the level of importance that the concept of ubuntu has within South African societies, despite the concept not being in the Final Constitution.¹⁷⁴

All of this is to show that a core concept of African bioethics, which is the concept of ubuntu as well as ensuring the good of the community, is ingrained within the culture and norm of the South African society.

4.3. A CRITICISM FROM SCHOLARS

The concept of 'African bioethics' has not been embraced by all scholars. As an argument against African bioethics was previously noted by *Tangwa*,¹⁷⁵ which stated that African bioethics could not exist as some scholars do not believe that there is even such a thing as African philosophy. Without the understanding that African philosophy exists, then there would not even be a discussion about such a concept as African bioethics.

¹⁷² Government of South Africa. The Constitution of the Republic of South Africa, 1996, s10.

¹⁷³ Y Mokgoro 'Ubuntu and the Law in South Africa' (1998) 1 (1) *PER/PELJ*.

¹⁷⁴ *Ibid*.

¹⁷⁵ *Tangwa op cit* note 140.

Another argument was against the initial idea of viewing ethics in accordance with the specific culture of each country.¹⁷⁶ The rationale for this is that having to consider the norms and culture within each country could bring about the acceptance of certain values that are universally considered as morally wrong, such as discrimination.¹⁷⁷

A major criticism of African bioethics, as noted by *Kanu*,¹⁷⁸ relates to the view that the concept of ‘African bioethics’ is redundant as it does not differ from Western bioethics in any major way. This way of thinking is to say that African bioethics could not be considered a real concept, as it does not have any truly novel principles that could be viewed as specific to African bioethics.

4.4. THE VALUE OF AFRICAN BIOETHICS

The African continent consists of fifty-five African countries, each with its own unique histories, cultures, and norms, thus there cannot be a generalized view framework for implementing bioethical principles within a society.¹⁷⁹ However, one aspect that resonates all throughout the continent is the concept of community.¹⁸⁰

As noted in the previous chapter, although artificial intelligence technology within healthcare has proven to be very useful and has plenty of applications, there is always room for further development.¹⁸¹ The potential of artificial intelligence technology in healthcare is largely based in its ability to take in and process large amounts of data.¹⁸² From this, the technology would be using this information to diagnose a patient and suggest an effective treatment.¹⁸³ The only way for patients to be certain of the treatment and for doctors to have more confidence when making use of this technology is for there to be ethical and legal frameworks in place to regulate the developments, implementation, and usage of artificial intelligence in healthcare.

¹⁷⁶ H T Have & B Gordijn ‘The Diversity of Bioethics’ (2013) 16 *Med Health Care and Philos*, p636.

¹⁷⁷ *Ibid*, p636.

¹⁷⁸ *Kanu op cit* note 150.

¹⁷⁹ Chukwuneke et al *op cit* note 127, p674.

¹⁸⁰ *Ibid*.

¹⁸¹ Wen & Huang *op cit* note 57.

¹⁸² *Ibid*.

¹⁸³ *Ibid*.

Since scholars are still deciding on such frameworks, it is submitted that the principles set out in African bioethics is necessary for the proper regulation of artificial intelligence technology within healthcare systems in African countries.

Authors provide that African culture can be applied to multiple aspects of the life of an African person, thus African bioethics which uses the African perspective when viewing ethics provides for the inclusion of certain values that were never considered under the Western perspective of ethics.¹⁸⁴ A consideration of these values is vital when it comes to creating a framework to regulate the usage of artificial intelligence within the healthcare system.

Overall, it is submitted that African countries have unique experiences which fuel the unique perspectives on what is considered as moral and ethical, this is the same for each region of countries all over the world. Thus, with these differing views of ethics, one country cannot staunchly apply the ethical views of another country, within their own societies, as there is a lack of context in the form of culture and norm. It is imperative that there be an inclusion of the African perspective on ethics reflected in the framework which will be created to regulate artificial intelligence technology in the healthcare systems of African countries.

4.5. CONCLUSION

This chapter set out the need for an African perspective on ethical principles that will be used when creating an ethical and legal framework which would regulate the development, usage, and implementation of artificial intelligence technology within healthcare, in African countries.

As previously noted, African bioethics is a term used when referring to the African perspective on ethics. The African perspective aims to promote the success and growth of the community -as opposed to a sole focus of the needs of an individual.

Despite there being fifty-five African countries, each with its own unique perspectives on morality and ethics, one common thought surrounds the concept of ubuntu; which speaks to individual within a community working together towards maintaining harmony within that community. This thought is what separates the widely recognised Western bioethics, from the much-disputed African bioethics.

¹⁸⁴ Kanu *op cit* note 150, p59.

Given that African bioethics is rooted in the common thought which links the perspectives of all African countries, it is only natural that when it comes to creating ethical and legal frameworks to regulate the usage of artificial intelligence within health care systems of African countries, scholars should pay mind to the perspective found within the teaching of African bioethics.

The following chapter will provide an evaluation on how this mini-dissertation provided answers for the research questions. Furthermore, there will be a summary on all of the information provided in the chapters and throughout the mini-dissertation.

CHAPTER FIVE

CONCLUSION

5.1. OVERVIEW

In order for there to be a successful argument for the topic, this mini-dissertation contained five chapters. The stance found throughout this mini-dissertation is that African bioethics needs to be considered and acknowledged when creating a framework which will be used to regulate artificial intelligence technology within the healthcare systems of African countries.

The research method used within the mini-dissertation is the doctrinal method, which means that all information has been gathered from articles and internet sources. This concluding chapter is a summary and a personal understanding of all the information which has been thoroughly cited from the available literature, throughout this mini-dissertation. The aim of this chapter is to structure the information in a summarised way, to ensure that the argument in favour of the topic is clear. As a structure, this chapter first provides a summary of chapter one: Introduction, chapter two: Artificial Intelligence, chapter three: Bioethics and chapter four: African Bioethics. This is followed by a look at each of the three main research question, with a short, summarised answer, which will be used to put all of the information within the context of these questions. Finally, there will be a final conclusion which reiterates the statement of purpose.

This concluding chapter is an overview of the information provided throughout the dissertation. Overall, in this chapter, there will be a summary of information which was discussed within each chapter of the dissertation.

5.1.1. Chapter One

The first chapter provided an introduction in terms of the mini-dissertation topic which is ‘The Importance of African Bioethics in the Development of New Artificial Intelligence Technologies Within Healthcare,’ as well as how the mini-dissertation is structured to have five chapters; all of which are used to provide an argument that would provide a backing for this topic. An effective method of research for such a dissertation topic was the doctrinal research.

The literature surrounding artificial intelligence technology within healthcare, provided that there will continue to be a growth in terms the implementation of artificial intelligence technology. This is especially so within the healthcare sector, as these technologies prove to be

a valuable asset in terms of assistance to medical practitioners. Such assistance includes a vast database of information about patients, which keep track of all changes in diagnoses as well as each patient's progress in terms of treatment. Overall, this assistance allows for the medical practitioner to have more time to dedicate to patients, and more time to take care of themselves, which would further ensure that patients are receiving the best care, as the medical practitioner is less stressed about manually keeping track of a patient's progress and can focus more on effective treatment and ways to bring about effective care for patients.

All of these are possibilities for how effective artificial intelligence technology could be within African countries, however the biggest hinderance to making these possibilities a reality involves the lack of sufficient policies being in place to regulate this usage of artificial intelligence technology, especially technology used within the healthcare sector. When it comes to implementing artificial intelligence technology it is important that there are legislative frameworks in place which would regulate the development, implementation, and usage of artificial intelligence technology within the healthcare sector. This is especially within the healthcare sectors of countries which would produce data of diverse populations which differ greatly from the data which was obtained from a developed nation and used in training the algorithm of this artificial intelligence. The reason for this is that the artificial intelligence technology will only work effectively in an environment which contained data that it was trained on, when implemented within an environment which contains data that is foreign to it, it would produce a diagnosis or recommendation which would be counterproductive. This is known as an algorithm bias. As mentioned previously within the mini-dissertation, the algorithm bias occurs during the development stage, as a result of the artificial intelligence technology being trained on data that was obtained from the developed nation that developed the technology.

The purpose of the mini-dissertation, as provided within the chapter, highlights the importance of having an African perspective on ethics being considered and used in the creation of any framework which aims to regulate the development, usage, and implementation of artificial intelligence technology within the healthcare sector, in African countries.

5.1.2. Chapter Two

The second chapter set out the artificial intelligence technology which is currently found within the healthcare system. Furthermore, there was an inclusion of the potential of artificial

intelligence within healthcare, as well as the current ethical and legal frameworks that are in place to regulate the usage of artificial intelligence technology within healthcare.

At the start, the chapter provided some insight into how it came to be that there is artificial intelligence technology which would have an effective use within the healthcare sector. Currently, there are various uses of artificial intelligence technology in healthcare systems, some of these include application within a clinical trial, medical imaging diagnoses, machine learning algorithms, and management of medical records.

According to the background of artificial intelligence technology, the most successful technology is the machine learning algorithms. This is due to its ability to take in large amounts of data, store it and use it to either diagnose a patient, or recommend a treatment that would be effective to that specific patient. Overall, the machine learning artificial intelligence technology is very useful within the healthcare sector, as it would alleviate the workload that is put on medical practitioners, such as reducing the need for the paperwork that a medical professional would need to do in order to keep track of each patient, thus this form of artificial intelligence has the most potential within healthcare.

Given the impactful nature of artificial intelligence technology, there needs to be a framework put in place to regulate the development, implementation, and usage of artificial intelligence technology within healthcare. This is important in that there needs to be the assurance of a guide which is put in place to provide ways of dealing with issues which may arise in during the development or usage of artificial intelligence technology in healthcare. Such an issue could be the misdiagnosis of a patient or the recommendation of a treatment which does not benefit the patient's health in anyway, or the recommendations of the artificial intelligence technology could lead to a patient being harmed. If there are no regulations in place, then in the event that a patient is harmed there is uncertainty regarding who would bear the responsibility for this harm, thus the patient would suffer a grievance but would not know who to hold accountable.

In terms of any ethical or legal frameworks which currently exist to regulate artificial intelligence technology within healthcare, the WHO provided six broad ethical principles. First is the protection of autonomy principle, which provides that a patient must be allowed to make a decision regarding their treatment. Thus, in order to satisfy this, the medical practitioner would have to inform the patient of their health, the possible treatment available, as well as the risks that are involved in undergoing the treatment. The second principle provides that the artificial intelligence technology must not display harmful conduct to people. The third

principle is transparency, which relates to the obligation placed on the medical practitioner, which is to always be clear in terms of the personal information surrounding the patient. This means that the patient should not make any decisions when they are confused about any aspect of the treatment or procedure. The fourth principle relates to responsibility and accountability. This requires there to be clear provisions regarding who would bear the onus if a patient is harmed as a result of the usage of artificial intelligence technology. The fifth principle is integral as it is one which calls for the promotion of inclusivity in each aspect of development of the artificial intelligence technology in order to ensure that the quality of the technology is effective. The sixth principle requires that the artificial intelligence technology be made in a way which promotes sustainability. These principles were intended to be broad enough to allow for the local legislative framework to fill in the gaps, thus allowing for the legal norms to be included within the framework.

5.1.3. Chapter Three

The third chapter provided a background into the concept of bioethics. With this, there is some insight into what Western bioethics is and why it is referred to as Western. The important thing to note is that scholars have used the term western bioethics, however what they mean is a Western perspective on ethics, which is the way in which ethical principles are interpreted according to the Western view and in terms of Western societal norms.

When the ‘father of bioethics’ created the concept of bioethics, he wanted to ensure that bioethics becomes a discipline which allows for inclusivity and cross-relations amongst the various fields of academia, such as philosophy, biological sciences, religion, etcetera. Even when created, bioethics was intended to be inclusive of cultures and norms, however, currently, there are opinions that there need not be so many considerations in terms of ethical principles, as it would be too congested. Contrary to this view, there are other scholars who correctly acknowledge the need for a diversity in terms ethical perspectives. Such a need for diversity is present due to the fact that there are different countries all over the world which have had differing experiences, history, and culture. All of these factors impact the perspective that each country has in terms of morality and what is viewed as ethical. One such differing view in terms of ethical perspective is present between the Western perspective on ethics, and the African perspective on ethics. These perspectives differ in that the Western perspective on ethics would emphasise the good of an individual, whilst the African perspective on ethics

would promote the good of the community. Thus, a Western perspective would be appropriate in a Western country, but an African perspective would be appropriate within an African country.

5.1.4. Chapter Four

The fourth chapter spoke about African bioethics and how important it is as a basis for an ethical framework which would be used to regulate artificial intelligence technology within African countries, such as South Africa. It is very important that the framework which will be implemented should showcase the norms which have been fostered and well understood by local people over years, as people are more accepting of such a framework instead of one where there are foreign concepts which have no context within the country.

The usage of artificial intelligence technology within African countries will be very beneficial to the healthcare sector in the future, this is especially due to machine learning algorithms which, as a possible overall goal, allows for medical practitioners to be able to concentrate more on taking care of patients, rather than keeping up with copious amounts of paperwork that comes with each patient, in order to keep track of the progress of the patient. Currently, artificial intelligence cannot comfortably be implemented within healthcare sectors of African countries, due to the fact that there are no frameworks in place to regulate the development, implementation, and usage of artificial intelligence technology within healthcare. The reason for this is that the lack of regulations, means that there is no clear procedure which would be followed in terms of holding a person or an entity responsible in the event that a piece of artificial intelligence technology harms a patient. People are most vulnerable when they are under the care of medical practitioners, thus it is imperative that the medical practitioners ensure that all methods of diagnosis, and treatment are done in a way which would not be harmful.

As a critique of African bioethics, there is a discourse which states that African bioethics cannot exist, furthermore it is not needed, this is false. It is necessary to consider the context within which a perspective on ethics which is used in a regulatory framework, comes from and its relevance within the country utilising this framework.

5.2. THE RESEARCH QUESTIONS

In this dissertation, there were three major question which have been identified as key in terms of an argument which provides support for the topic. These questions are firstly, what is the potential of artificial intelligence technology in healthcare?, secondly, what are the fundamental principles of Western bioethics and African bioethics?, and lastly, how can African bioethics be used to develop an ethical and legal framework which would regulate the development, and usage of artificial intelligence technology in healthcare, within a South African context?

5.2.1. The potential of artificial intelligence technology in healthcare

Artificial intelligence technology in healthcare has potential due to the machine learning technology. Machine learning is a form of artificial intelligence which operates within a database. It is able to take in a lot of information, interpret the information, then provide an appropriate solution. This is very useful, because the artificial intelligence technology could do the work of keeping track of patient records, whilst the medical practitioner could always have easy access to such information without having to spend hour looking for information. Thus, this helps in terms of an ease of access enjoyed by medical practitioners.

5.2.2. Fundamental principles of Western bioethics and African bioethics

Western bioethics has a focus on the good of the individual. In terms of the principles of bioethics, Western bioethics views the principle of beneficence to mean that the patient must be treated appropriately. The principle of non-maleficence provides that the patient cannot be harmed. The principle of autonomy aims to make sure that the patient is able to have full control of their body, and to be able to make all of the decisions regarding the treatment.

African bioethics has a focus on the good of the community. As such the African perspective interprets these ethical perspectives in a unique way. The first and second principles of beneficence and non-maleficence work together to promote the wellness and security of the community. Thirdly, the principle of autonomy is viewed as a principle for solidarity, which encourages the individual to respect the community within which they are living. The final principle of justice looks to promote fairness in order to further promote the good of the community.

5.2.3. African Bioethics being used to develop an ethical and legal framework which regulates the development and usage of artificial intelligence technology in the South African healthcare sector

As previously noted, in order for there to be an effective legal and ethical framework, policy makers must acknowledge the perspective of ethics which would provide a context which is relevant within the country.

African bioethics encompasses two concepts which are integral within the democratic South African society. These are the concept of ubuntu as well as human dignity. Both of these concepts were considered as important enough to be viewed as a constitutional value when policy makers were drafting the Interim Constitution. As previously noted, this showed how integral these concepts were in a new democratic South Africa, which looked to promote equality and fairness for all.

5.3. RECOMMENDATION AND CONCLUSION

In lieu of the dissertation topic, it is submitted when it comes to the development, implementation, and usage of artificial intelligence technology within African countries, there needs to be appropriate ethical and legal frameworks in place which would regulate artificial intelligence.

Artificial intelligence technology in healthcare within African countries would be very beneficial, and more so with the correct framework in place to regulate the technology. In creating an appropriate framework, scholars should look to creating this framework against the African perspective of ethics, more commonly referred to as African bioethics, rather than insisting on the current globally recognised bioethics, which is centred around the Western perspective on ethics. The Western perspective on ethics is ineffective when it comes to looking at ethical issues suffered by non-Western countries. Many African countries view ethics in light of what is good for the community as a whole. This is encompassed within the concept of ubuntu. The most important thing, as noted throughout the dissertation, is inclusivity in terms of the ethical perspectives of different countries.

It is submitted that the teaching of African bioethics provides a way for the inclusion of, as well as some type of understanding of, the experience, norms, and cultures of many African countries, within the scholarly world.

Thus, the development, implementation, and usage of artificial intelligence technology within healthcare needs to be regulated in terms of the ethical considerations provided in the African perspective on morality and ethics, as centred around the concept of ubuntu.

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STATUTES

The Constitution of the Republic of South Africa, 1996.

Miss Laila Nur Muhammed (219069111)
School Of Law
Howard College

Dear Miss Laila Nur Muhammed,

Original application number: 00021739

Project title: The importance of African bioethics in the development of new artificial intelligence technologies in healthcare

Exemption from Ethics Review

In response to your application received on 13 June 2023, your school has indicated that the protocol has been granted **EXEMPTION FROM ETHICS REVIEW**.

Any alteration/s to the exempted research protocol, e.g., Title of the Project, Location of the Study, Research Approach and Methods must be reviewed and approved through an amendment/modification prior to its implementation. The original exemption number must be cited.

For any changes that could result in potential risk, an ethics application including the proposed amendments must be submitted to the relevant UKZN Research Ethics Committee. The original exemption number must be cited.

In case you have further queries, please quote the above reference number.

PLEASE NOTE:

Research data should be securely stored in the discipline/department for a period of 5 years.

I take this opportunity of wishing you everything of the best with your study.

Yours sincerely,



Mr Matthew Blain Kimble
obo Academic Leader Research
School Of Law

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