

Chapter 15

Ethics in Diagnostic Radiography in South Africa: A Complex Temporary Encounter Mediated Through Text and Technology



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Abstract Diagnostic radiography or medical imaging is a discipline where a broad range of high-technology equipment is used for medical diagnosis in order to guide patient management. The role of the radiographer requires the integration of knowledge, complex technology and advanced technical skills within an environment where effective and caring interaction is needed with patients. The patient engagement tends to be a relatively short, singular event and can be considered as a complex temporary encounter. There is also the need to interact with other healthcare practitioners to facilitate the provision of quality health care and service through a multi-disciplinary team approach. The rapid evolution in medical imaging requires the radiographer to continuously adjust to new emerging technologies and techniques that make continuous professional education essential. Ethical practice in radiography therefore involves a complex interlinking of good clinical decision making, safe and accurate practice, a commitment to empathetic patient relationships, the ability to function effectively within the multi-disciplinary team and honouring of the principles of lifelong learning. A unique aspect of ethical practice in radiography is radiation protection that is underpinned by respect for the principles of justification and optimisation. Radiographers must therefore pay attention to image quality while considering radiation safety for each patient but must also be aware of ionising radiation as a public health issue.

Keywords Ethical decision making · Radiation technology · Medical radiation imaging · Radiation safety · Optimisation · Utilisation

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15.1 Introduction

In this chapter the focus will be on selected ethical issues faced by radiographers (radiation technologists) practising in the diverse healthcare institutions representative of the South African context. Furthermore, selected ethical dimensions of practising in a resource constrained environment will be discussed and awareness of the competing agendas such as utilisation, optimisation, access, cost of service and safe practice will be raised.

The radiography profession in South Africa (SA) is represented by diagnostic radiography, nuclear medicine technology, diagnostic ultrasound and radiation therapy. In all these radiography categories the practitioner must integrate scientific knowledge, professional competence and technical skills, mediated through text (e.g. procedure requests, radiological reports and medical records) and technology (e.g. hospital and radiology information systems, picture archiving systems and medical imaging equipment). However, each category has a specific scope of practice and unique ethical dimensions. The focus of this chapter is specifically on diagnostic radiography but with acknowledgement that some of the discussion will also pertain to the other categories.

In the twenty-first century medical imaging has undergone rapid technological change and has been influenced by the advances in the molecular management of disease. In the South African context there is diversity between state and private medical services, as well as on the continuum from primary health care, through district and regional facilities to the tertiary and academic institutions (Makanjee et al. 2014b). Developments bring new opportunities and a widening gap between the well-resourced environments and the resource-constrained state health system. So for example, advances in antenatal ultrasonography allow for selective foetal therapy while standard ultrasound screening during pregnancy is not available to all. This challenges the ethics principles guiding the performance of any examination and decision-making processes pertaining to the selection of the most suitable procedure, appropriate modification of practice, referral patterns, marketing of services, handling of confidential information and conduct of research (Barron and Kim 2003).

Jonas (1984) discusses the risk of harm to future generations due to the incessant technological developments that are now part of our daily existence. His principle of responsibility emphasises prospective aspects such that to be responsible one must be sufficiently informed and able to reflect on the possible future implications of present actions. This ability to look forward is the relevance to diagnostic radiography practice as radiation risk is not limited to the patient but can also affect the next generation. Although there is no consensus on the hereditary effects of ionising radiation, responsibility in diagnostic radiography must include a duty towards future generations (UNSCEAR 2001). This ethical imperative exists in an environment of trivialisation of imaging technologies where the first step to improved responsible practice might be to address the lack of knowledge related to the use of ionising radiation for the effective management of the patient. Furthermore,

developments in technology mean that the responsible radiographer (radiation technologist) must retain currency in a rapidly changing environment by reading and evaluating relevant research, participating in research, investigating innovative techniques and best practices they can adopt or adapt and sharing information through publications and presentations.

15.2 Regulatory Bodies Governing Imaging Services

Ethical practice in radiography must include radiation protection. The role of the National Department of Health, Directorate: Radiation Control (RCD) is to regulate safe use of ionising and non-ionising radiation for healthcare providers, non-healthcare providers (e.g. engineers and software programmers), patients and the public. To achieve this, RCD provides guidelines, procedures and safe practice requirements for the maintenance and use of equipment. The RCD and the Health Professions Council of South Africa (HPCSA) promote radiation protection including adherence to justification (appropriate and defensible use), optimisation (maximising of desired effect) and limitation (dose not exceeding the recommended dose limit) (ICRP 2007) and the principle of keeping radiation exposure as low as reasonably achievable (ALARA). Regulations also relate to the maintenance of accurate and complete medical records (i.e. a blend of digital and/or paper-based records) which include mediation texts (e.g. request forms, images and radiological reports) (HPCSA 2008b).

In South Africa the Board for Radiography and Clinical Technology (RCT), a committee of professionals and public representatives appointed by the Minister of Health, must meet the goal of the HPCSA to protect the public and guide the professions. The RCT regulates radiography education and registration of clinical training sites, prepares the code of ethics and standards of practice and administers continuing professional development (CPD) of radiographers. The RCT also processes public complaints against radiographers deemed to have acted unethically (HPCSA 2008c).

15.3 Access to Imaging Services

Since South Africa's first democratic election in 1994 the commitment to equal medical care for all and access to quality healthcare remains dependent on the economic and socio-political status of the individual (Nkwanyana 2017). Equitable access to medical imaging services is pivotal to any healthcare system and the challenge lies in overcoming the geographical discrepancies in distribution of radiological service and per capita levels of imaging capacity. Absence of equitable access is a rights-driven ethical dilemma where the right of all citizens to quality healthcare

is not achieved. The challenge for radiographers is to provide ethical and quality care services in diverse contexts.

Within any healthcare institution it is the structural and organisational components that aid or interfere with the effective and efficient functioning of the imaging department. The department's location, infrastructure and type of care and services, should ideally align with the values of the health system as a whole. Furthermore, a high-quality, professional diagnostic service with empathetic patient care is dependent on good communication (i.e. between individuals, healthcare team members, diverse healthcare providers, non-healthcare providers and patients) underpinned by cooperation, coordination and collaboration as key enablers from the point of referral to task completion (Makanjee et al. 2015a) to promote access and appropriate utilisation. The findings of Van Schouwenburg, Ackermann and Pitcher (2014) following an audit of access by first users of magnetic resonance imaging (MRI) services in the public health care sector of South African highlight the need to systematically monitor and evaluate the clinical utilisation of the scarce resource (e.g. MRI radiographer) in order to enable the continued provision of high cost imaging services in healthcare environments with severe funding limitations. The challenge of aligning clinical demands with health system capacity demonstrated the importance of collaboration between executive hospital management and the medical imaging department. Furthermore, there was evidence for the potential for low cost service changes to result in significant clinical benefits. The principle of interdependence and interrelatedness organisationally, structurally and at an operational level within the healthcare system is therefore essential (Makanjee et al. 2014b). A mechanism of accomplishing excellence and access in health care is a comprehensive quality assurance management programme of systematic collection and evaluation of data (Papp 2014). In radiography this includes the review of patient care, patient selection parameters, scheduling, management techniques, departmental policies and procedures (e.g. equipment quality control), in-service training and timeliness for reporting.

15.4 Utilisation of Imaging Services

The ethical principles of beneficence and non-maleficence are applicable to utilisation. Non-maleficence is based on the goal to “do no harm”. In radiology this principle is more about reducing harm to the minimum and avoiding radiation exposure whenever and however possible. Hence it may be argued that it is ethical practice to expose an older patient to a diagnostic radiology examination when there is an indication that they have a serious medical condition (e.g. malignant tumour) because the low-dose radiation-induced chronic radiation effects are less significant for older persons. To the contrary it would not be considered as ethical practice to expose persons younger than 40 years of age to mass screening using radiation (e.g. mammography). However mammography may well be justified in the case of a

younger person who presents with clinical symptoms or with a relevant family history (Doudenkova and Pison 2016). The principle of “do no harm” also takes account of potentially harmful risks that are underestimated or unknown. In South Africa this could include such aspects as the use of radiation in preventative care and/or defensive medicine. The concern is the medicalisation of healthy people who are exposed to the associated risks or high technology imaging modalities. Mung’omba and Botha’s (2012) study that was conducted in rural KwaZulu-Natal in South Africa describes the socio-demographic factors that influence the desire for medical imaging procedures. Although not many of the study’s patients had knowledge of X-rays, the factors that influenced their utilisation of imaging included; age, level of education, the anticipated benefits of an X-ray, low levels of awareness and poor interpersonal communication between healthcare personnel and their patients. In order to practice in a paradigm that promotes and defends non-maleficence the healthcare practitioner must engage with the patient and provide clear information regarding the risks and benefits associated with the imaging procedure.

Beneficence (“doing good”) is an ethical measure to do what is in the best interests of the patient. In medical imaging this principle would mean that no procedure should be conducted unless it is deemed necessary. Yet the current medical culture, including the application of “defensive medicine”, is prevalent in the developed world and expanding in developing world contexts. The diverse South African environment with state of the art medical facilities alongside community medicine has growing demands and it appears that justification must be more rigorous to defend a decision not to do a procedure than to do what is not necessary act (Malone and Zolzer 2016). In a country that has inequality of access to medical imaging services it is often the case that the available resources are utilised for the protection of medical practitioners against possible litigation rather than maximising the use of resources for real patient needs. Worldwide there is an increase in the use of medical imaging, as well as reports of its overuse (Doudenkova and Pison 2016).

15.5 Ethical Practice

Ethics emerged from moral philosophy with key elements of human behaviour and values in order to allow for the evaluation of whether a person’s actions are right or wrong and whether they acted with good or bad intentions. In South Africa there is a national regulatory body (HPCSA) that legislates registration for practice and that provides a governance framework for ethical practice through the provision of practice standards that are aligned to the scope and codes of practice. These high-level documents dictate the responsibilities of individual practitioners and together with the professional association and employers provide guidance on how medical imaging requests are processed and how radiation dose is managed. Some of these components of ethical practice will be discussed in the following sections.

15.5.1 Practice Standards

In radiography the practice standards of the profession define practice, serve as a guide for appropriate behaviour and practice, and establish criteria to determine compliance. Practice standards can be used to establish education requirements and evaluate the quality of practice, service and education in a particular professional category. Furthermore, practice standards can be applied by healthcare facilities to develop job descriptions and practice parameters. Further study allows for extended or specialist practice accompanied by a job description for imaging such as in mammography or ultrasonography. The value of practice standards is that they inform those external to the medical imaging profession, provide an overview of the role and responsibilities of the practitioners as defined by the HPCSA scope of practice and set standards against which a professional can be held accountable and responsible for their action and conduct in performance of their daily tasks (HPCSA 2008a).

15.5.2 Scope and Codes of Practice

Whilst a patient undergoing a diagnostic imaging investigation that involves the potential for harm may be unaware of the risk, they place their trust in the expertise and professional judgment of the radiographer. Radiography practice is influenced by national regulations, professional scope of practice, ethical codes and professional job descriptions. The ethical responsibilities of radiographers include the provision of respect and dignity to all patients by ensuring the patient has privacy and by honouring the ethical standards of confidentiality. Trust is the foundation of the patient/radiographer relationship and of professional and ethical behaviour. It is therefore essential that radiographers meet the required ethical standards and conduct themselves in such a way that they gain the trust and confidence of members of the public and thereby serve the public interest and the individual patient. The code of conduct for radiographers in South Africa establishes standards of professionalism and ethics that include ensuring that the work environment is safe for everyone, and being accountable for professional acts and possible acts of negligence related to practice (Peer 2003; Beyer and Diedericks 2010).

The shortage of radiologists is a challenge in South Africa, as in many developing countries. This places demands on radiographers to assume roles beyond their scope of practice (Du Plessis and Pitcher 2015). For instance, the lack of senior medical practitioners during after-hours periods in trauma units means that the inexperienced medical officers on duty rely on radiographers for a radiographic opinion. However, establishing revisions and expansions of professional boundaries have not sufficiently progressed in South Africa. According to Du Plessis and Pitcher (2015) the expanding or blurring roles and responsibilities can only be achieved where there is comprehensive preparation and collaboration between the relevant profes-

sionals so as to establish sustainable and quality health care. However, radiographers frequently assist medical practitioners despite clear regulation changes. This is especially the case where radiographers have been trained in pattern recognition and when they desire effective and efficient patient management (Makanjee et al. 2015c). In these situations, it may impact negatively on the balance of risks and benefits for the patients, but it should be recognised that the ethical dilemmas that arise do not have simple answers and the principles of non-maleficence and beneficence can be complex considerations for furthering respectful and effective practice.

15.5.3 Registration for Practice

The first requirement of professional registration and practice is educational preparation and clinical competence. The HPCSA requires registrants to continually update their post-qualification professional knowledge, skills and competency; hence CPD is a requirement of maintaining registration. This includes mandatory continuing profession units (CEUs) in ethics, human rights and medical law. Radiographers must therefore have current knowledge and possess the necessary competencies to practise within the evolving scope of practice and emerging technologies in order to optimise patient safety and care. The responsibility for provision of opportunities lies with a variety of stakeholders (e.g. employer and professional association) but accountability rests primarily with the practitioner (HPCSA 2008d).

15.5.4 Request for Procedure

The referring healthcare practitioner takes a decision to refer the patient for radiographic imaging based on their expert knowledge and clinical judgment. The assumption is that the practitioner has the necessary knowledge to support a request for the most appropriate imaging investigation. The referring practitioner is also primarily responsible to duly justify the chosen procedure which in turn should optimise the choice of investigation. However, according to Makanjee et al. (2014b) the traditional paradigm of history taking, physical examination and provisional clinical diagnosis is often replaced by premature requests for imaging investigations. The Radiological Society of South Africa (RSSA) has adapted the Royal College of Radiology (RCR) referral guidelines for implementation in both private and public health sectors (Kabongo et al. 2015). The authors emphasise that referral protocols must be regularly evaluated and adjusted to provide customised diagnostic imaging protocols and procedures that meet the needs of a resource constrained environment in order to reduce the significant and systematic practices of inappropriate examinations and to improve patient throughput. Radiographers are

important role players for successful implementation of referral guidelines and while referring practitioners have the primary responsibility to justify requests, radiographers, and where applicable radiologists, have the primary responsibility for examination optimisation. Radiographers are reliant on the quality of the referral request and on the patient perspective to take good decisions and to achieve optimal quality images.

All requests for an imaging procedure must be in writing, signed by the person requesting the examination (s) and the clinical indication must be clearly indicated. In South Africa imaging procedures may only be requested by a registered healthcare practitioner as defined in the National Health Act (Act No. 61 of 2003). In addition, any healthcare practitioner who contravenes the policy and ethical rules in terms of requesting imaging procedures must be reported to the Legal Department of the HPCSA or the South African Nursing Council (SANC). Radiographic reports are processed in terms of the professional conduct provisions of the Radiation Control Directorate of South Africa. A radiographer in his or her professional capacity must evaluate the information provided in any request form and may refuse the request provided that good and sufficient grounds exist. The reasons include the following: requesting clarification of the qualifications and/or competency of the healthcare professional making the request and the possibility the request is unsubstantiated (e.g. the clinical history does not justify or necessitate the performance of the examination requested). From a radiographer's perspective a request must be complemented by confirmation of the clinical information from the patient regarding their condition and the reason(s) for referral (i.e. clinical questioning). The radiographer must also explain the procedure in order to justify decisions with regard to any imaging investigation. This process contributes to the prevention of errors of misrepresentation or misunderstanding of the patient's condition and clinical history. Also, it furthers the aim to complete only correct and necessary projections. As part of the effective healthcare team communication process, radiographers are expected to report any additional knowledge they acquire about the patient. The process flow of request, justification, confirmation and clarification guides good decision making, helps to prevent errors (e.g. imaging an incorrect region of interest) and contributes to good medical management of the patient in the post-imaging phase (Lam et al. 2004; Snaith and Lancaster 2008).

This "gatekeeper" function is sometimes circumvented when healthcare practitioners, including radiographers, collude with or are coerced by referrers and accept incomplete, inadequately justified or otherwise inappropriate examination requests (Makanjee et al. 2015a). The radiographer must therefore be attentive to uncritically assume that a request for a procedure necessarily means that it is medically required; any inadequate justification cannot be merely overlooked based on practice imperative shifts to only perform examinations. In the study by Makanjee et al. (2015a) radiographers indicated that questioning the validity of the request frequently ended up with their voice being silenced and a command by the referring healthcare practitioners to "just do it". They also indicated that medical practitioners were often unaware of the importance of providing a relevant clinical history and do not have high-level knowledge regarding radiographic examinations and projections. The

solution to improving request documents that lead to appropriate examinations and the optimisation of radiation dose levels is to increase effective communication between the referring practitioners and the radiographers (RSA 2010).

15.5.5 Radiation Dose

Doing “good” and making requests that are for the good of the patient involve seeking optimal medical care for each patient. Therefore, the imaging request should involve the lowest possible dose of ionising radiation within the specific medical indications. This is especially important when X-rays are used for imaging children who carry a higher potential risk to radiation, as well as for any patient for whom alternative diagnostic options exist. In the context of radiation dose the ethical principle of beneficence requires due justification of the choice of radiographic examination, for example, referring a child for Computed Tomography (CT) because it is easier to access than an MRI requires professional judgment and ethical awareness. That is, exposing the patient to unnecessary radiation risk by preferring the CT versus the cost of an MRI investigation. Within the South African context the private healthcare environment provides largely for persons who have access to medical aid and financial resources; the options available are therefore wider. Public healthcare however is under-resourced with limited available options. This means that standard radiography imaging is more frequent and the availability of specialised services (e.g. MRI and CT) is limited to tertiary and some regional level hospitals that are accessed through referral pathways Mankjee et al. 2014b).

The aim of radiation protection is to utilise radiation in a manner that optimises the benefit. This means that the optimisation of radiological protection in medical exposure acknowledges the dose received by the patient, but requires that this dose is kept “as low as reasonably achievable” (ALARA). This can be explained as managing the radiation dose to the patient by considering the potential risk and benefit related to the patient’s medical condition. The optimisation of protection for patients having X-ray procedures also includes ensuring that the equipment design, construction, selection and installation are appropriately done. Management of radiation dose therefore includes equipment design and available technology to manage patient dose and diagnostic reference levels (DRLs) determined for the specific local, regional or national context (Do 2016).

15.6 Informed Consent

An obligation to provide information during the practice of contemporary radiography involves the key ethical principles of respecting autonomy, doing the what is in the best interests of the patient (beneficence) and avoiding harm (non-maleficence) (Doudenkova and Pipon 2016). Respect for autonomy is reflected in

healthcare practice by obtaining informed consent from patients for procedures that could potentially undermine dignity and integrity (Beauchamp and Childress 2001). In the medical encounter of referral by means of a request form (text) for an imaging investigation (mediated through technology) a person/patient has the right to take part in the decision making process (HPCSA 2008c). Chapter 2 of the National Health Act (No. 61 of 2003) states that every healthcare practitioner must inform and explain the following to the patient:

- The available diagnostic procedures and treatment options generally available to the patient;
- The benefits, risks, financial implications and possible implications associated with each option;
- The patient's right to decline health services; and
- The risks associated with such refusal

In addition, regarding the disclosure of information and consent for referral for a diagnostic imaging investigation, the HPCSA (2008b) guidelines state the following: "Where a patient has agreed to be referred for an x-ray, referring practitioners may make relevant information available to diagnostic radiologists". It has already been indicated (see Sect. 5.4 above) that radiographers require clinical information to confirm the appropriateness of the investigation requested and the projections needed. This is confirmed by re-interviewing the patient. The patient may not fully understand the relevancy of the re-interview process as they cannot easily appreciate the complexities of the benefit versus risk principle or the need for the selection of the most appropriate diagnostic imaging investigation. One ethical dilemma faced by radiographers therefore is that there is often insufficient clinical information provided or adequate justification for referral by the health care provider. Also, patients interacting with radiographers frequently have little insight on the reason for the referral and /or other possible diagnostic choices (Makanjee et al. 2014a).

Implicit consent is another important ethical consideration in radiography. In South Africa implicit consent is considered sufficient for agreeing to general radiographic investigations ("X-rays"). Implicit consent means that a person has made his or her will known in a tacit way. In other words, the patient agrees by being there and not resisting the examination. With regard to complex and invasive medical imaging procedures namely (i.e. biopsy, cardiac catheterisation, angiography, etc.) and that has the potential for relatively high radiation dose (dependent on exposure time), written informed consent is the standard because of known and higher levels of potential risk for the patient. One of the challenges however lies in the communication of the risks to the patient as it cannot be characterised with certainty. There is currently no agreement on the need to inform patients about the radiation risks in contemporary diagnostic imaging practice. This explains why it is infrequent that medical practitioners provide information on these risks to their patients. Informed consent and the appropriateness of raising the question of radiation dose and whether the patient should be informed when older equipment is used that has the potential to deliver higher doses than newer equipment is even more challenging (Robey et al. 2014). This is further complicated because while the latest technolo-

gies are more efficient and can potentially reduce the radiation dose to the patient, research has demonstrated that the introduction of modern digital systems in diagnostic imaging, has contributed to increases in radiation dose (ICRP, 2004). It is in fact the case that the advantages in terms of image quality, digital processing capabilities and digital transfer, disguise the potential for increasing the dose to the patient and many radiographers are still not aware that digitalisation has resulted in increased and sometimes unnecessary exposure. Unfortunately this increased dose can even occur without significant increases in image quality.

The confusion regarding the need for informed consent or not and the role of the radiographer in the informed consent process is a challenge, at a time when the ethical and legal standards promote patient participation in decision making. Still it appears that patients are often inadequately informed about the risks associated with ionising radiation (Makanjee et al. 2015b) and patients are seldom questioned by the referring practitioner regarding pregnancy and radiation (Makanjee et al. 2014a). This situation might be better resolved by wider deliberation using the pragmatic value set than based on the legal or ICRP systems alone. Both afford interesting opportunities for reflection and analysis, but the broader perspective of values provides pointers that help view the problem more holistically. The radiographers in these situations are left to solve the informed consent dilemma by choosing to continue with the imaging procedures or to refer patients back to the medical practitioner. In the case of CT examinations, patients were found to be mostly uninformed and were requested to sign consent forms without proper knowledge of the radiation risk or alternatives to CT. The routine nature of radiography as a service can gradually induce “professional blindness” toward risks and can minimise the importance and need to duly inform patients about radiation risks, thereby violating the principle of autonomy. Yet, several aspects of radiography are not known to patients, such as, the use of high-dose imaging technologies in the quest for quality images outweighing arguments for improved patient protection (Makanjee et al. 2014a, b, 2015a, b). Hence the patient may agree to a procedure, but not to the specific imaging technique (Doudenkova and Pison 2016). So for example a patient may agree to a Barium Enema investigation but without full knowledge of the dose from the projection series. Leading on from this, radiographers in South Africa record the number of projections, the radiation exposure time and in the case of screening procedures, the actual dose. However, these records are not made available to the patients. This raises the question of informing the patient of their actual accumulative dose based on the ethical guidelines that state “... however small the risk, the patient should be informed” (HPCSA 2008b). In the gatekeeper role, the radiographer must balance the possible lack of awareness of the medical practitioner regarding the risks of ionising radiation and the application of the argumentative shortcut, such that the medical practitioner assumes that the patient has the knowledge and understanding of commonly prescribed examinations, and therefore knows the risks involved (Makanjee et al. 2015b). However, literature suggests the opposite about the “presumed” known risks and patient knowledge of associated risks for medical imaging. In fact, patient knowledge has been found to be largely lacking (Makanjee et al. 2015b; Doudenkova and Pison 2016).

15.7 Conclusion

Radiographers worldwide work in a rapidly-changing and complex environment. In South Africa this is further complicated by the challenges of well-resourced health-care facilities alongside poorly resourced facilities. Radiographers in South Africa are therefore faced with multiple professional challenges, namely working with ionising radiation, the need for good interpersonal skills to optimise the patient experience, functioning within the multi-disciplinary team and retaining professional competency through CPD. In addition, they must also contemplate the ethics of inequality of access and optimising the available healthcare resources. Helpful ethical approaches for the deliberation of ethical issues and dilemmas include awareness of human rights, non-maleficence, beneficence and social justice. These approaches and principles inform practice-based considerations in the process flow of request, justification, confirmation and clarification. Also, it guides good decision making, contributes to good healthcare management of the patient and helps to prevent professional errors. Possibly the most important message for ethical practice is that the radiographer must be consciously aware at all times.

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