

peer reviewed **OPINION ARTICLE**

Mammographers and equitable breast imaging in South Africa

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Breast imaging services in South Africa are currently facing a crossroads. Policies meant to protect patients against inadequate services are instrumental in denying patients their right to access to adequate services. The largest percentage of the population is dependent on public healthcare, but they do not have the same access to breast imaging services as those who can afford private healthcare. One reason for this is the public sector's stark shortage of radiologists combined with a limited professional scope for mammographers.

This opinion article claims that mammographers ought to be trained to perform some of the functions of radiologists. Skills transfer pertaining to breast ultrasound and image interpretation should decrease the workload of radiologists, spread the availability of traditional radiologic expertise, and provide for the breast care needs of the whole population in a more equitable manner, as is strived for in the National Health Act, No 61 of 2003.

Keywords scope, legislation, education, ethics, inequity

Introduction

Access to breast imaging services in South Africa (SA) mirrors the distribution of healthcare commodities that disproportionately affect lower and middle income socio-economic groups worldwide.^[1,2] By far the largest percentage of the population is dependent on public healthcare, but they do not have the same availability of breast imaging expertise as those who can afford private healthcare.^[3,4] One reason for this is the public sector's dire shortage of radiologists.^[5] In practice, this means that the number of patients being imaged by mammographers (some countries use the term mammography technologist, radiologic technologist and radiographer) is limited by the availability of radiologists who can interpret the images and follow-up the findings; patients not able to afford private sector fees are less prone to benefit from early breast cancer detection and treatment. Apart from the effect this situation has on mortality and morbidity rates,^[6] it also points out the ongoing need for progress towards a high uniform standard of service and, ultimately, improved breast health for the whole nation.

In order to address the national unequal access to breast imaging services, I claim in this article that mammographers ought to be trained to effectively perform some of the duties of radiologists in the public sector. Such an intervention should allow additional time for radiologists to attend to a larger number of breast imaging patients

and more work-up procedures. I introduce the problem and contextualise it by giving an overview of the breast imaging domain and statistics on the SA healthcare system. I also explore the SA legislative mandate regarding equal access to healthcare services for all and I identify the conflicting legislation that currently prevents mammographers from extending their clinical roles. I argue the clinical and educational suitability of mammographers for additional training, and support this by referring to mammographer role extension developments in the United Kingdom (UK) and Australia. Lastly, I motivate for official mammographer scope extension from an ethical perspective.

There are undeniably other means of addressing the shortage of radiologists in the public sector, just as there are other factors like poverty, unemployment, ignorance and lack of infrastructure contributing to the problem of inequitable access to breast imaging in this sector.^[5] This opinion article however focuses on role extension for mammographers in an effort to alleviate the workload of radiologists in the public sector.

Breast imaging domain

Breast cancer is the leading cause of cancer related mortality in women.^[7] In SA the number of cancer-related deaths amounted to 41 300 in 2014; 20 600 were females and approximately 3 300 were due to breast cancer.^[8] It is the most

common cancer among women of all race groups, its incidence and mortality rates are increasing and breast cancer awareness, prevention, treatment and care had been identified as a national priority in the 2017 Breast Cancer Prevention and Control Policy document.^[9]

Early detection and subsequent treatment of early stage localised breast cancer result in five-year survival rates exceeding 80%, while patients diagnosed at an advanced stage, fare much worse, with a five-year survival rate below 40%. Early breast cancer is most effectively detected through mammography, but globally, optimal breast imaging is still lacking. One of the challenges identified by the World Health Organisation (WHO), is that women with limited resources often do not have (early) access to breast imaging services.^[11] At the Chris Hani Baragwanath Academic Hospital in Gauteng, 54% of the breast cancer patients are diagnosed with stage III or IV breast cancer.^[6]

South African healthcare

The SA healthcare system is supported by two pillars: the poorly resourced public sector which operates on a budget determined by the gross domestic product (GDP) and provides services to 84% of the population; and the well-resourced private sector which services 16% of the population who can afford medical insurance and out of pocket payments. Partly due to the legacy of apartheid prior to

1994, subsequent corruption and poor management of the healthcare system, and major disparities in the per capita expenditure between the public (R1 200) and the private sectors (R12 000), access to healthcare for those dependent on the public sector is inferior compared to the private sector.^[3] Added to these historical, managerial and financial burdens that hinder equitable access to healthcare, is the distribution of specialised human resources which is skewed to the advantage of the private sector.^[10] In the field of breast imaging, this is evident in the stark shortage of radiologists in the public sector.

It was reported that the Radiological Society of South Africa (RSSA) stated in an unpublished speech in 2006 that the public sector has an acute shortage of radiologists;^[11] December 2015 statistics indicate the total number of radiologists registered by the Health Professions Council of South Africa (HPCSA) as 925^[12] versus a population of 54 956 900.^[13] HPCSA statistics do not distinguish between private and public sector practicing radiologists or whether the registered radiologists are in fact practicing in SA, but considering that the private/public population percentage split (16%/84%) as well as the per capita expenditure (R12 000/R1 200)^[3] broadly adhere to the Pareto principle (80/20 rule of thumb),^[14] the same principle is likely to apply to the distribution of private/public practicing radiologists.

Application of Pareto thus means that roughly 20% (185) of the registered radiologists are practicing in public facilities, servicing 44 million people, while 80% (740) service 11 million people in the private sector. These figures firstly portray a national radiologist/population ratio of 1 per 59 000, which is insufficient if compared to the ideal specialist/population ratio of 1 per 13 000 advised by Australian authorities.^[15] Australian figures are used for benchmarking as clearly defined SA norms have not been established.^[16] Secondly, it shows a public radiologist/population ratio of 1 per 238 000 and a private radiologist/population ratio of 1 per 15 000. The Pareto derived estimates differ considerably from the estimated 357 public and 473 private radiologists mentioned in a 2014 RSSA publication; however, the 0.84 radiologists/100 000 public sector lives versus the 5.4 radiologists/100 000 private sector lives^[17] confirms stark inequitable access to radiology services.

These statistics clearly indicate that in SA, population groups have general unequal access to healthcare which inevitably also impacts on specialist radiological services pertaining to breast imaging. This status quo brings to question the position of SA legislation regarding health services.

Legislation

In contrast to the reality of disparities in healthcare services, stands the Constitution of the Republic of South Africa, known as the most progressive national constitution in the world.^[18] Contained in the Constitution is the Bill of Rights, the cornerstone of democracy; it upholds the values of human dignity, equality and freedom. Section 9 of the Bill of Rights states: all people are equal, with the right to equal benefits and protection by the law. Furthermore, that the state may not unfairly discriminate directly or indirectly against anyone or any group, and that national legislation should be enacted to prevent or prohibit such discrimination. Section 27 indicates that everyone has the right to have access to healthcare services and that the state should adopt reasonable legislative and other measures, subject to available resources, to achieve the progressive realisation of this right. The Bill furthermore states that the state must, subject to certain limitations, respect, protect, promote and fulfil the rights of all the people in SA.^[19]

Apart from the Constitution, healthcare services are also regulated by other sources of law. One of the objectives of the National Health Act of 2003 (61), is to regulate national health and provide uniform health services across the nation in an equitable manner, within the means of available resources. Chapter 7 (48) addresses the obligation to have an adequate distribution of appropriately trained staff as well as the effective and efficient utilisation thereof to meet the whole population's healthcare needs at all levels of the healthcare system.^[20]

The Health Professions Act of 1974 (56), instituted the HPCSA, which controls the health professions by regulating standards of training, professional practice and ethical behaviour to protect the public from the rendering of inadequate services. According to HPCSA regulations, radiographers, inclusive of mammographers, are restricted to perform only professional

acts that fall within the scope of their profession.^[21]

The legal and professional frameworks that regulate healthcare services, inclusive of breast imaging services, namely the Constitution, the National Health Act, the Health Professions Act, and the HPCSA, clearly have the protection and promotion of the whole population's health as paramount objectives. Ironic thus, is the glaring mal correlation between these ideal intentions and the reality of current statistics indicating grossly disparate services in general, and flagrant disproportions in the distribution of private and public sector radiologists, which negatively affects the (early) detection of breast cancer in the population dependent on public health services.

A case for mammographer role extension

The insufficient number of radiologists is not the only element that limits the breast imaging service in the public sector, but it is known that human resource density is an important predictor of health outcomes.^[22] As radiologists are responsible for all breast image interpretation and work-up procedures to either confirm or rule out breast cancer, it is accepted that their shortage does have a negative effect on the breast imaging service in the public sector.^[23] The obvious solution to this problem is to train and employ more radiologists, but the general shortage of medical practitioners available for specialisation and, the statement of the RSSA in 2009 that the need for radiologists currently exceeds the rate at which they can be trained,^[5] render this solution impractical. The RSSA's initiative to provide public health facilities with image reporting services via an information technology portal to assist with the alleged 100 000 unreported images in some hospitals, has also not materialised.^[24]

The question thus arises as to what can be done to assist the current number of radiologists with their workload so that more patients in need of breast imaging can be accommodated. One answer is task shifting, recommended by the WHO and defined as the redistribution of tasks to extend health services to all people by moving specific tasks traditionally performed by a highly qualified group, to a group with shorter training and fewer

qualifications.^[25] Should this route be followed, the procedures that will greatly reduce the workload of radiologists, if performed by another group, need to be identified.

All mammography images need to be interpreted and reported by radiologists. If non-radiologists assist with interpretation, albeit at a basic level, to eliminate and manage true negatives according to prescribed protocol, radiologists would then need to attend to only the more complicated cases. In SA, radiologists also often perform supplementary ultrasound imaging on patients to support mammogram interpretation; performance of these scans by non-radiologists will significantly impact on the radiology workload. Both image interpretation and ultrasound are furthermore indicated by the Breast Health Global Initiative and the European Breast Cancer Network as fundamental breast imaging procedures^[26-28] and assistance in these regards should thus markedly reduce the current workload of radiologists. Even though it is suggested that these two functions are performed by non-radiologists, it is stressed that both are crucial steps in the accurate diagnosis and subsequent management of breast cancer. Transfer of these skills will have to be done with utmost attention to competence and high standards of performance, and great care should be taken to transfer these skills to persons most suitable for the task.^[23]

In 2015, the HPCSA communicated an envisaged scope of practice for clinical associates, whose role would be to assist with the general healthcare workload in the public sector. Their proposed clinical scope is extensive, covering acts from several healthcare domains and includes ordering and interpreting x-rays, formulating diagnoses and performing fine needle aspirations of breasts and nodes.^[29] Considering the wide range of acts they will be performing over several domains, and the stipulation that it must be under supervision, it is probable that their training in medical imaging, and specifically breast imaging, will be superficial, resulting in sub-optimal patient outcomes.^[23]

In contrast to clinical associates, are mammographers breast imaging specialists with sound fundamental knowledge of breast anatomy, physiology and pathology in addition to their scientific knowledge

of optimal image production practices. They are trained and experienced in ethical patient care practices, routinely interact with breast imaging patients, are already considered part of the breast healthcare team and their competence is highly regarded by their patients.^[30] Mammographers are also already competent in breast image interpretation in terms of technical factors and recognition of normal and abnormal anatomical appearances;^[31-33] they thus have a solid foundation to which additional radiology focused image interpretation knowledge and skills can be added. As mammographers often assist radiologists during ultrasound-guided biopsies, they also have a basic understanding of the ultrasound modality and its application.

From an education and clinical perspective, mammographers' existing knowledge of, experience in, and familiarity with the medical imaging discipline at large and breast imaging in particular, render them the logical choice for skills and knowledge upgrading to incorporate the two traditional radiologist functions (image interpretation and ultrasound).^[23] It is furthermore suggested that a multi-skilled breast imaging specialist, capable of performing x-ray and ultrasound imaging plus image interpretation will reduce the time between initial imaging and subsequent disease management.^[30]

Like many other occupations in the healthcare sector though, radiography, of which mammography is a sub-speciality, is listed as an occupation in high demand^[34] and it is possible that widening the scope of mammographers to include skills from the radiology domain may only transfer the short staffing problem from one occupation to another. That does however not negate the argument made for mammographers being the most suitable candidates to assist with the radiology workload; their advanced training and application will be a cost and time-effective approach to improve the breast imaging needs in the SA public sector in terms of accessibility, equity and good quality: the core principles of the WHO's task shifting approach.^[25] Continuously revised strategies from the Department of Higher Education and Training (DHET) to manage the challenges of occupations in high demand, address aspects like funding allocation, qualifi-

cations development, career advice and enrolment planning,^[34] and one must be confident that these will eventually have a positive impact on the current number of radiographers specialising as mammographers.^[23]

International scenario

The shortage of radiologists is not unique to SA. In the UK the problem was alleviated by extending the clinical roles and responsibilities of mammographers to include a wide range of skills and responsibilities traditionally reserved for radiologists: consultant breast radiographers perform breast image interpretation, ultrasound, image-guided biopsies, vacuum-assisted biopsies, fine needle aspirations, image-guided localisations, and gel marker insertions. This extension of the traditional role of mammographers resulted in an improved service, because waiting times, that were previously inequitably long for some patients, were shortened and became the norm.^[35]

Recent Australian research indicates that mammographers have the ability to assist radiologists with image interpretation; it has been proposed that Australia follow the lead of the USA, Europe and the UK to introduce advanced practice roles which incorporate traditional radiologist duties.^[33,36] The capability of mammographers and radiographers to perform image interpretation to a standard comparable with that of radiologists, is further indicated by a steady stream of international evidence.^[31,32,36-41]

Ethical reasons for mammographer scope extension

The suggestion that mammographers should perform duties additional to their current scope of practice is controversial and associated with various complexities in need of discussion. The ethical conundrum that I address in this article is presented by two questions based on bioethical principles.

First, do we truly honour the principle of beneficence when we allow inequitable availability of, and access to, breast imaging services in order to comply with professional regulations laid down by the HPCSA in its endeavour to protect the public against inadequate services rendered by sub-optimally trained health

professionals? This question refers to the continuing situation where the population dependent on public health services has unequal access to breast imaging services in comparison to the population serviced by the private sector, in part because of a shortage of radiologists combined with a mammographer scope of practice that does not allow mammographers advanced training to perform traditional radiologist procedures. Beauchamp and Childress^[42] state that the principle of beneficence demand people to take action – positive steps – to help others. Beneficence does not relate to the mere passive avoidance of harm which is the current state in public sector breast imaging: avoiding harm by not allowing any group but radiologists to interpret images as only radiologists are sufficiently trained to do so. The transfer of some radiology knowledge, skills and roles to mammographers is educationally controllable and, since there is a long standing lack of effective interventions to improve the prevailing situation, it is my opinion that the current status quo is not honouring the bioethical principle of beneficence.

Second, will we transgress the principle of non-maleficence if we subject the public to inadequate services rendered by insufficiently trained health professionals in favour of the strive towards more equitable availability of, and access to, breast imaging services according to the constitutional values of equity and freedom from discrimination? This question refers to the possibility of transferring vitally important knowledge, skills and roles inadequately to mammographers, resulting in sub-standard services and inaccurate diagnoses, while attempting to establish more equitable access to breast imaging services. "One ought not to inflict evil or

harm" is the non-maleficence obligation laid upon health professionals and implicit hereto is also the obligation not to impose risks of harm.^[42] Thus, if the knowledge, skills and role transfer from radiologists to mammographers happens in such a way that it results in a diminished quality breast imaging service, even though it provides a service to a larger part of the population, it will be deemed as transgression of the principle of non-maleficence.

Both questions refer to unethical situations, even when considered against the backdrop of restricted available resources and the innate noble intent of restricting scopes of practice. If however, the status of sub-optimally trained mammographers is changed to optimal and adequately trained mammographers, the possibility of inadequate services being rendered will be minimised if not totally negated, which in turn will indicate progression towards the constitutional ideals of equitable access and freedom of discrimination as well as the HPCSA regulated standards of training and care.^[23]

The challenge in the above argument is undoubtedly the educational transformation of sub-optimally trained mammographers to optimal and adequately trained mammographers. In this regard a case was made for the choice of mammographers to be trained and allowed into the domain of radiologists, as the two professions already share a common body of knowledge in the specialised field of breast imaging, albeit currently not at the same standard and with different applications. To meet the challenge, an advanced training programme that will effectively and efficiently advance mammographers' existing knowledge and expertise to incorporate new, higher order radiology orientated skills, to a standard

comparable with that of radiologists, was developed with the input of the radiology profession and guidance from educational institutions already offering such advanced training courses.^[23]

CONCLUSION

Access to healthcare in SA has improved markedly since 1994, but the lack of radiological services in the public sector still presents a major challenge to the promise of equitable access for everyone, written into the Bill of Rights. Policies meant to protect patients against inadequate services are instrumental in denying patients the very right to access to adequate services. Given the long standing shortage of radiologists, new and alternative strategies that challenge historical dogma should be implemented in a serious effort to eradicate discrepancies among population groups and health systems.

Mammographers are the best qualified group for skills transfer from the radiology domain but their current scope of practice does not allow them to perform functions they have not been trained for. An advanced training programme, based on scientific research, is now available to extend their skills and spread the availability of traditional radiological expertise in an effort to address the current ethical dilemma of good, but insufficient breast imaging expertise in the public sector. The next step is to unite the support of the radiography and radiology professions and to muster energy from statutory bodies to adapt existing scopes of practice to promote the effective use of appropriately trained staff to meet the healthcare needs of the whole population in an equitable manner, as is strived for in the National Health Act.^[20]

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