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Review Article

Establishing a New Radiotherapy Centre in Al-Ahsa, Saudi Arabia: Challenges and Successes

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Abstract

Background: The burden of cancer in Saudi Arabia continues to increase, necessitating equitable expansion of oncology services. Radiotherapy is a cornerstone of cancer treatment but remains unevenly distributed across regions.

Aim: This article presents the establishment of the Abdul Latif Jabr Radiotherapy Centre at King Fahad Hospital, Al-Ahsa. We describe epidemiologic context, service gaps, implementation strategies, and the challenges and successes encountered.

Results: Major challenges included regulatory approval, infrastructure design, workforce shortages, and cultural acceptance. Successes included multisectoral collaboration, timely commissioning of linear accelerators (LINACs), integration of advanced radiotherapy techniques (IGRT, VMAT, DIBH), and effective workforce training programs. Within 18 months, the centre reduced external referrals by >70%, improved compliance, and provided comprehensive radiotherapy services including pediatric radiotherapy with anesthesia support.

Conclusion: The Al-Ahsa radiotherapy project demonstrates that decentralized, high-quality radiotherapy delivery is achievable in Saudi Arabia. Strategic partnerships, investment in human capital, and patient-centered approaches are critical to sustaining oncology expansion under Saudi Vision 2030.

Keywords: *Radiotherapy, Cancer care, Saudi Arabia, Oncology services, Health system development, Vision 2030*

Introduction

Saudi Arabia is undergoing a transformative period in healthcare under Vision 2030, which prioritizes equitable access to specialized medical services. Cancer incidence is rising in the Kingdom and while major urban centres host well-established oncology facilities, significant regional disparities in access to radiotherapy persist.

In this context, the establishment of a new state of the art radiotherapy centre in Al-Ahsa is aimed at not only expanding treatment capacity, enhancing early intervention, prioritizing accessibility to radiotherapy but also at decentralizing cancer care and supporting long-term national oncology strategies.

This article outlines the establishment of the Abdul Latif Jabr Radiotherapy Centre in Al-Ahsa, Eastern Province, describing both the barriers overcome and the strategic successes achieved. [1-4]

Cancer Epidemiology in Saudi Arabia

The Saudi Cancer Registry (SCR) is one of the first national registries in the Kingdom of Saudi Arabia, established in 1992 under the authority of the Ministry of Health MOH. From 2001–2018, the SCR reported an increase of 179% in cancer cases, with a higher increase in females than males. In 2022, 24,470 new cancer cases were reported (54% women, 46% men). Median age: 57 (males), 53 (females). Leading cancers were breast, thyroid, colorectal among females and colorectal, prostate, Non-Hodgkins Lymphoma in males. Childhood cancers represented 4.5% of all cases.

Cancer Screening and Impact on Radiotherapy

The Saudi Health Council – National Cancer Centre conducted studies on the value and cost-effectiveness of screening for five malignancies in the Kingdom– Breast, Colon, Cervix, Lung and Prostate. Breast cancer and colorectal cancer screening have proven cost-effectiveness and are in place in the majority of regions. This has profound impact on patient throughput within Radiotherapy departments.

Early detection rates of cancers results in more curable cancers thereby increasing the need for adjuvant radiotherapy. In identifying more localized disease the demand for precise definitive techniques, organ sparing and more hypofractionated (radiotherapy delivered over fewer fractions) protocols increases. There is increasing emphasis on adopting advanced radiotherapy techniques to reduce longterm toxicity to nearby organs especially as increasing cancer survival is predicted.

Decentralising radiotherapy by developing centres in Al-Ahsa, is critical to reducing referral overload in larger tertiary centres in Riyadh, Dammam or Jeddah and improves timeliness of care.

Radiotherapy Services in Saudi Arabia

Cancer care in Saudi Arabia is provided through multiple public sectors, including Ministry of Health (MOH), Ministry of Higher Education via University Hospitals, National Guard Ministry and the Arabian American Oil Company ARAMCO. In addition, the private sector also contributes to medical and radiation oncology services.

The latest data from the Saudi National Council 2024 confirms the Kingdom has over 20 radiotherapy centers equipped with a total of 40 linear accelerators, 4 cyberknife, 4 tomotherapy and 1 Gamma knife machines located throughout the 13 regions in KSA.

The Kingdom has also established the region's first Proton Beam Therapy Centre, at King Fahad Medical City, Riyadh.

Whilst the expansion of radiotherapy services over the last decade is clear, the current LINAC ratio in the Kingdom is 1 per 875,000-1,000,000 population – significantly lower than the recommend IAEA (International Atomic Energy Agency) average of 4-5 linacs per million population and significant geographic disparities persist.

Radiotherapy in the Eastern Province

The Eastern Province is the largest and one of the most economically important provinces in the Kingdom of Saudi Arabia. Covering a vast area -approximately 710,000 square kilometers- it makes up about 36% of the total area of Saudi Arabia. It serves a population of Around 5.1 million. The major cities include Dammam (provincial capital), Khobar, Dhahran, Al-Ahsa, and Jubail.

The National Cancer Centre in 2021 identified 4 Linacs serving this region at the time. King Fahad Specialist Hospital Dammam (KFSHD) – hosting two linear accelerators and ARAMCO in Dharan also 2 linear accelerators- available only for employees of ARAMCO.

The National Cancer Centre also stated that to serve the Eastern province – 10 Linear accelerators were necessary given the vast area and population.

Since that report two private hospitals located in Dammam and one in Al-Ahsa also provide radiotherapy services.

Establishing the Radiotherapy department in Al-Ahsa

In December 2023, the Abdul Latif Jabr Oncology Centre at King Fahad Hospital, Al-Ahsa, was inaugurated. Funded through a gracious charitable donation from the Al Jabr family, the stand-alone state of the art oncology facility spans three floors:

- Ground floor: Radiotherapy
- First floor: Medical oncology and treatment unit, out-patient clinics, pharmacy
- Second floor: Lecture theatre, meeting rooms and Pediatric oncology ward

The radiotherapy department has one CT–Simulator and three bunkers; two housing VARIAN VitalBeam LINACs, with commissioning of the first LINAC completed in early 2024.

The initial workforce comprised 2 radiation oncologists, 4 radiation therapists (treatment radiographers), 5 medical physicists (including a Radiation Safety Officer) and 1 nurse.

Eighteen months after opening, the centre now delivers state-of-the-art radiotherapy for most cancer types, reducing referral overload in outreach centres and significantly reducing time to starting radiotherapy and improving the cancer treatment journey for patients.

Challenges

1. Regulatory and Licensing

Navigating the regulatory landscape was a substantial task. Radiotherapy services require multi-level authorization from the Saudi Food and Drug Authority (SFDA), Civil Defense and the Ministry of Health (MOH). Verification and approval was sought based on the NCRP/ICRP guidelines. Rigorous radiation safety assessments and policy initiation required significant time and manpower.

2. Infrastructure and Equipment Procurement

Designing and constructing a facility that meets International Atomic Energy Agency (IAEA) standards presented a technical challenge. Site shielding requirements, LINAC bunker specifications, and HVAC systems tailored for radiation oncology environments necessitated specialized architectural expertise and s significant financial commitment.

3. Workforce Recruitment

The Kingdom has a newly established training program in radiation oncology- a collaborative venture with academic institutions, which will in the near future lead to a skilled workforce of radiation oncologists however in the short term - international hiring partially addressed this gap.

Saudi Arabia is also shortly due to open its doors to the first residency program for the training of medical physicists in radiotherapy.

In the meantime, there remains national shortage of qualified senior radiation oncologists, medical physicists, dosimetrists and radiotherapy technicians remains a critical bottleneck.

Some licensing requirements from the Saudi Commission for Health Specialties (SCFHS) and visa requirements limited recruitment.

The training of staff including physicists and radiation therapists required robust partnerships with more established centres such as KFSHD.

4. Cultural and Patient-Centric Barriers

Patient education and cultural sensitivity were essential to the acceptance of a new radiotherapy centre in Al-Ahsa. While most patients were delighted that radiotherapy was available near their home; avoiding the need to travel long distances for repeated sessions -there was some apprehension about a new centre being able to offer the same treatment as well-established centres. This required a significant amount of targeted outreach programs, social media coverage and patient education.

Successes

1. Multisectoral Collaboration

The centre's success was driven by collaboration with different sectors. The planning of the estate build, installation of equipment and procurement relied on extensive multisectoral relationships with engineers, vendors and various stakeholders.

Training of staff on all levels also relied on significant ties with King Fahad Specialist Hospital Dammam. Radiation therapists and physicists were encouraged to seek and explore training opportunities and build competence and skills in their field.

From the clinical perspective, patient referrals were accepted and welcomed from outreach MOH hospitals, National Guard and the private sector. This model facilitated resource pooling, technical assistance and impacted the centres reputation positively whilst working in alignment with national cancer strategies.

2. Commissioning of LINAC

The commissioning of the LINACs involved a structured series of steps performed by medical physicists, engineers, and radiation oncologists critical to ensures the safe, accurate, and effective delivery of radiation therapy to cancer patients. This included Pre-Installation planning of room shielding design and verification (based on NCRP/ICRP guidelines), power supply, cooling, and ventilation requirements. Mechanical installation and setup of the LINAC with Electrical and network integration with TPS (Treatment Planning System) and OIS (Oncology Information System). Following Acceptance testing to confirm Mechanical accuracy, Radiation output consistency and Imaging system functionality came Commissioning Tests following AAPM TG-51, TG-142, TG-106, and TG-148 protocols. This ensured Beam Data Collection, Imaging System Calibration, System Integration and End-to-End Testing were all in place. Robust Quality Assurance implementation and Regulatory and Safety Approvals were applied before the first Linac was commissioned.

3. Technological Integration

At initiation of the radiotherapy service in Al-Ahsa we were able to introduce advanced technologies including Arc/ VMAT therapies and image-guided radiotherapy (IGRT). Deep Inspiratory breath hold DIBH technique soon followed. Support from VARIAN has been absolutely critical in both establishing our radiotherapy centre and ensuring its continued success. Their expertise, technology and ongoing guidance were essential in getting the service up and running, and their continue partnership remains a key factor in or ability to deliver safe, high-quality treatments for patients every day.

4. Education

Developing clear cancer pathways in-line with international guidance and evidence based practice was key in establishing a well-informed department. The Head of radiation Oncology developed clinical treatment protocols in line with international practice and provided in house training and educational forums for all its staff. Every clinical case undergoes rigorous peer review with clinicians and physicists , digitally documented, prior to treatment commencing.

Partnerships with KFSHD aided the training and development of the radiation therapists and physicists. Senior physicist support continues to be provided both on-site and remotely.

Furthermore, governance, morbidity and mortality reviews were also put in place to learn from any errors and put in place policies and procedures to minimize future occurrences.

Out-of-centre training was also utilized extensively – via VARIAN clinical schools and VARIAN-thinktank.

5. Capacity Building, Patient Outcomes and Access

Since its inauguration, the centre has resulted in a significant reduction of referrals to outreach centres for radiotherapy by over 70%. This has meant that patients are now receiving treatment closer to home, reducing treatment travel times for patients. Preliminary outcomes show significantly improved compliance rates and reduced timeframe in initiating definitive and adjuvant radiotherapy. The accessibility of palliative and emergency radiotherapy has also expanded, enhancing quality of life for patients with advanced disease.

At the time of writing the centre has recorded over 158% increase in the number of fractions being delivered in 2025 compared to 2024 with more than 140% increase in the number of patients being treated during the same timeframe.

The centre recorded 100% rates of delivering emergency radiotherapy within 24 hours, with 100% of all palliative treatments commencing within 5 days. For radical/curative, treatments 90% commenced within 10 working days with the vast majority being ready within 5 days.

Preliminary data also demonstrates overall good safety and toxicity profiles for most treatments, positive feedback from patients and referring colleagues.

The centre has full capacity to treat almost all disease sites including – concurrent definitive chemoradiation for rectal cancer, bladder, CNS and thoracic malignancies. Adjuvant breast and radical Prostate radiotherapy are standard treat- ments with plans for five fraction prostate SABR to be introduced soon.

6. Paediatric radiotherapy

A unique field within radiation oncology focused on treating cancers in children- requires precise techniques, tailored protocols in line with international clinical trials and a robust multidisciplinary approach. Usually Paediatric radiotherapy is the last specialty to be incorporated in a new radiotherapy centre due to the extensive demands, requiring input from a multitude of other specialties. Our centre was able to incorporate daily anaesthesia into the radiotherapy department within a very short time of opening its doors due to the great efforts of paediatric oncologists, hematologists, anesthesiologists and nursing teams.

The centre has since accepted referrals for paediatric radiotherapy from a number of outreach center's owing to the clinical expertise of the radiation oncologist, physicists and advanced techniques provided. Amongst the success stories included an 11 year old child with high risk medulloblastoma treated successfully with 3 arc VMAT craniospinal radiotherapy.

Discussion

The successful establishment of the Abdul Latif Jabr Radiotherapy Centre project highlights that while regulatory and workforce barriers remain, high-quality decentralized radiotherapy is feasible. Success depended on Vision 2030 alignment, partnerships, technology adoption, and workforce training. This model may inform cancer care expansion in Saudi Arabia and the wider Gulf region. [1-4]

Conclusion

The Abdul Latif Jabr Radiotherapy Centre represents a landmark in decentralizing cancer care in Saudi Arabia. It demonstrates that bridging regulatory gaps, investing in human capital, and embracing innovation are key to sustainable expansion. Continued investment in workforce development and technological innovation will be essential to meet rising cancer demand and achieve Vision 2030 goals.

Conflict of Interest

The authors declare no conflict of interest.

References

1. Saudi Cancer Registry (SCR). *Cancer Incidence Report, Saudi Arabia 2023.* Riyadh: Saudi Health Council.

2. Saudi Health Council. *National Strategy for Cancer Control in the Kingdom of Saudi Arabia.* Riyadh: Saudi Health Council.
3. American Association of Physicists in Medicine (AAPM). *AAPM Task Group 142 Report.*
4. International Atomic Energy Agency (IAEA). *Setting Up a Radiotherapy Programme: Clinical, Medical Physics, Radiation Protection and Safety Aspects.*