

Research Article

Establishing a Multi-disciplinary Adult Oncology Unit at Muhimbili National Hospital: Lessons Learned, Challenges, and Opportunities amidst Tanzania's Growing Cancer Burden

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In light of the escalating cancer burden in Tanzania, Muhimbili National Hospital (MNH) embarked on a transformative initiative, utilizing the Capability, Opportunity, Motivation (COM-B) framework to meticulously design an implementation strategy. This collaborative effort yielded a dedicated chemotherapy ward, an expanded workforce, and ongoing professional development programs. The success of MNH's Adult Oncology Unit highlights the critical significance of adaptability, stakeholder engagement, and an unwavering commitment to meeting the rising demand for cancer care in resource-constrained environments.

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Introduction

The Escalating Cancer Burden in Tanzania

The global surge in cancer incidence is notably pronounced in low- and middle-income countries like Tanzania, which face a grappling multifaceted burden of infectious and non-communicable diseases^{[1][2][3]}. The developing countries' epidemiological landscapes are exacerbated by socio-economic factors, giving rise to a diverse range of cancers. From infection-related cancers linked to poverty to those associated with affluent lifestyles marked by tobacco use, alcohol consumption, and sedentary habits, the spectrum is broad and challenging^{[4][5][6]}.

Within this complex scenario, Tanzania faces a substantial disparity in comprehensive cancer care services. The nation had a centralized cancer care model, with one center serving as a specialized center providing chemotherapeutic and radiotherapeutic treatment modalities. The challenge with the centralized model was that it placed formidable demands on both the institute and the broader healthcare system. Moreover, the advanced stages of cancer at the time of diagnosis compound the challenges, hindering the achievement of comprehensive remission and favorable therapeutic outcomes for patients who reach the referral center^{[7][8]}.

The Urgency of Expanding Cancer Care

The rapidly increasing incidence of cancer, projected to reach over fifty thousand new cases by 2025, exerts significant pressure on the already overburdened healthcare infrastructure. Notably, cervical cancer takes the lead, constituting a quarter of all cases, followed by breast and prostate cancers^[9]. Public awareness campaigns, the availability of expertise, and screening and diagnostic services contribute to this upward trend but simultaneously pose a challenge for the existing healthcare delivery model^[10].

In response to this urgency, the establishment of an Adult Oncology Unit at Muhimbili National Hospital (MNH) emerges as a strategic imperative. As a national referral hospital, MNH's

multidisciplinary approach, facilitated by inter-departmental consultations, promises improved quality of care and outcomes. However, the path to this establishment is not just a reaction but a carefully orchestrated methodology designed to address the gaps in cancer care comprehensively.

Methodology

Objectives and Aims of the Adult Oncology Unit

The foundational pillars of the Adult Oncology Unit at MNH were driven primarily by the commitment to augment the coverage and accessibility of comprehensive cancer care services within Tanzania. This objective is not arbitrary but meticulously designed to respond to the unique challenges posed by the cancer landscape in the country.

Rationale for Expanding Cancer Care to Tertiary Hospitals

The decision to extend cancer care services to tertiary hospitals, particularly MNH, is grounded in response to the escalating demand for comprehensive oncological care, overcoming challenges posed by resource constraints, infrastructural limitations, and the previously existing centralized cancer care delivery model.

Scope and Services of the Adult Oncology Unit

The Adult Oncology Unit at MNH is composed of a broad spectrum of services that span the entire oncological care continuum. From the initial stages of screening and diagnosis to the intricacies of targeted surgical and chemotherapeutic interventions, the unit, stationed at the MNH-Upanga campus, leverages the existing infrastructure. With a dedicated focus on pediatric oncology care, a realm that MNH-Upanga has been pioneering since 2011, the unit aspires to be a beacon of comprehensive cancer care within the Tanzanian healthcare landscape.

COM-B Framework Application^[11]

Capability: Recognizing the capability challenges faced by the oncology unit, particularly in terms of limited physical infrastructure and human resources, we selected intervention functions aimed at building organizational and individual capacities. This involved restructuring the physical space by converting ward 10 into a dedicated chemotherapy administration area, thereby enhancing the capability to serve a larger number of patients daily.

Opportunity: The opportunity for improvement in collaborative initiatives between different departments, for example, internal medicine and the surgical - converting an existing ward in the surgical block into a specialized chemotherapy administration space, created an opportunity to enhance cross-departmental collaboration and foster a comprehensive multidisciplinary approach to cancer care.

Motivation: The motivation to address staffing and infrastructure challenges stemmed from MNH's commitment to meeting the growing demand for cancer care. By implementing a collaborative initiative and transforming existing spaces, MNH demonstrated a strong motivation to reduce waiting times and ensure timely access to vital cancer treatments.

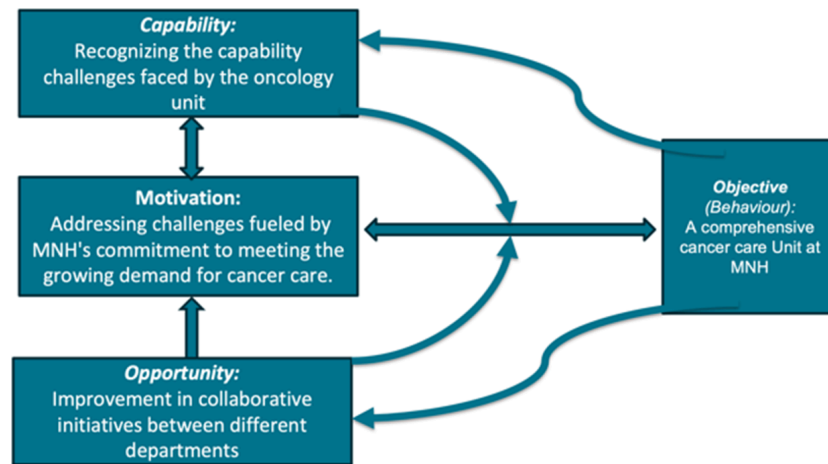


Figure 1. COM-B framework

Practical Strategies

Collaborative Initiative: Engaged key departments, namely internal medicine and surgical, in a collaborative effort to find a dedicated space for chemotherapy administration, addressing the infrastructure challenge.

Physical Restructuring: Converted ward 10 into a specialized space for chemotherapy administration, significantly boosting the unit's capacity to accommodate up to 55 patients daily.

Cross-Departmental Collaboration: Focused on fostering collaboration between internal medicine, surgical, pathology, and radiology departments to create a comprehensive multidisciplinary approach to cancer care.

Proactive Problem Solving: Implemented a solution-oriented approach to overcome challenges, demonstrating MNH's dedication to meeting the growing demand for cancer care and ensuring timely access to vital treatments.

Program Implementation: Enhancing Human Resources at MNH

The program implementation phase focused on addressing the critical need for human resources in the oncology unit at Muhimbili National Hospital (MNH). Recognizing the initial staffing challenges, the intervention aimed to augment and train the workforce, ensuring the delivery of personalized and comprehensive cancer care.

Hiring and Training of Oncologists:

Needs Assessment Integration: Building upon the needs assessment, which highlighted a shortage of clinical oncologists, the program strategically addressed this gap. MNH embarked on a targeted recruitment process to augment the number of clinical oncologists.

Collaborative Recruitment Strategy: Engaged in collaborative efforts with medical institutions and professional networks to attract skilled oncologists with expertise in both radiation and medical oncology.

Workforce Expansion: Through a concerted effort, the oncology unit expanded from an initial staffing of three nurses, one clinical oncologist, and two medical oncologists to a robust team of six clinical oncologists and two medical oncologists.

Specialized Expertise: Ensured that the newly recruited oncologists possessed diverse expertise, covering various types of cancers, thereby broadening the unit's capacity to diagnose and treat a wide range of conditions.

Extended Working Hours: Recognizing the increasing patient load, the unit implemented outpatient clinics from Monday to Saturday, alternating between specialists in clinics and those attending to inpatients.

Training Initiatives for Oncology Staff:

Continuous Professional Development: Instituted ongoing training programs to enhance the skills and knowledge of the oncology team. These programs covered essential areas such as wound care, chemotherapy administration, basic clinical research, and advanced procedures like bone marrow transplantation.

Comprehensive Training Programs: Ensured that the training initiatives covered a spectrum of expertise, addressing both basic and advanced aspects of cancer care. This approach aimed to keep the oncology team updated with the latest advancements in the field.

Regular Skill Updates: Established a framework for regular updates to ensure that the oncology staff remained well-versed in contemporary practices, enabling them to provide state-of-the-art treatment to patients.

Nursing Staff Expansion:

Trainer Approach: Implemented a trainer approach to expand the nursing staff, which resulted in the recruitment of 11 dedicated oncology nurses and five attendants.

Capacity Building: Ensured that the new nursing staff received comprehensive training to build their capacity to deliver specialized care to cancer patients.

Optimized Staffing: By expanding the nursing team, MNH optimized staffing levels, allowing for better patient care, enhanced support services, and improved overall efficiency. Figure 2.

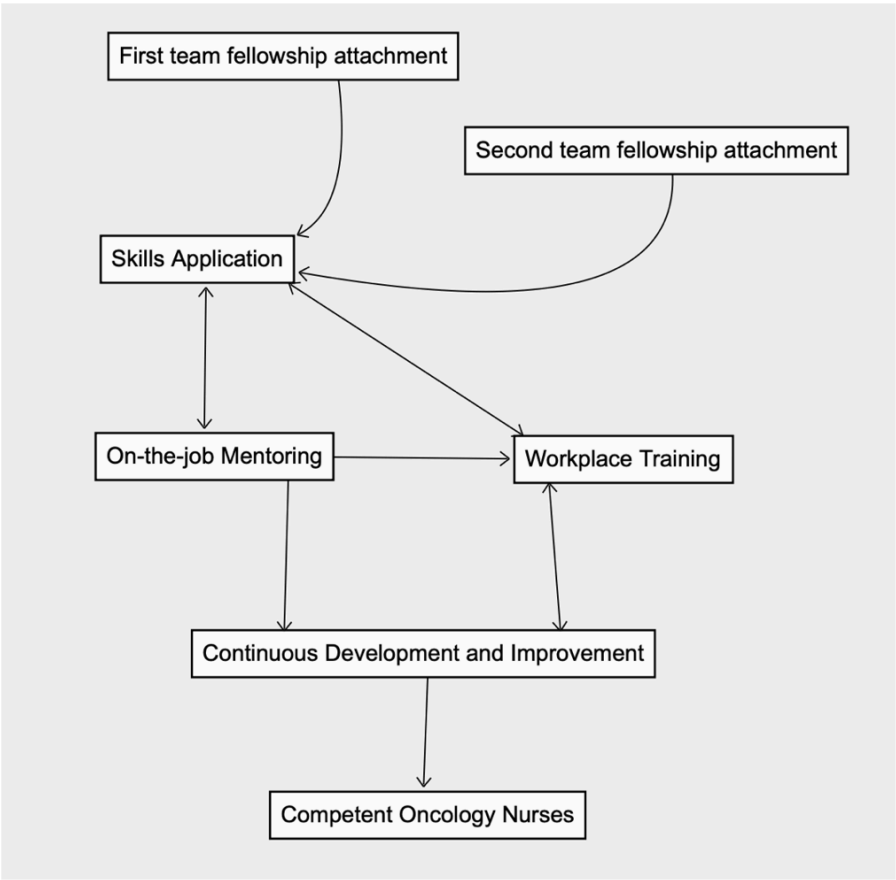


Figure 2. Hands-on model for training oncology nursing staff at Muhimbili National Hospital.

Discussion

The increasing cancer burden in Tanzania, shaped by socio-economic factors, required a strategic response to challenges posed by infectious and non-communicable diseases^[2]. The initial centralized cancer care model, designed for specialization, strained both the institute and the

broader healthcare system. The urgency to expand cancer care services led to the establishment of the Adult Oncology Unit at Muhimbili National Hospital (MNH).

The methodology applied was meticulous and purposeful, addressing the unique challenges in Tanzania's cancer landscape^{[7][12][13]}. The foundational pillars, driven by the commitment to augment comprehensive cancer care, reflect a carefully orchestrated response. Expanding cancer care to tertiary hospitals, especially MNH, recognized escalating demands and the need to overcome resource and infrastructural constraints^{[14][15]}.

The scope and services of the Adult Oncology Unit at MNH reflect a comprehensive approach spanning the entire oncological care continuum. With a dedicated focus on pediatric oncology care, the unit aspires to be a model of comprehensive cancer care within the Tanzanian healthcare landscape. This expansion coincided with an increase in the number of patients with various types of cancers, as depicted in Figure 3.

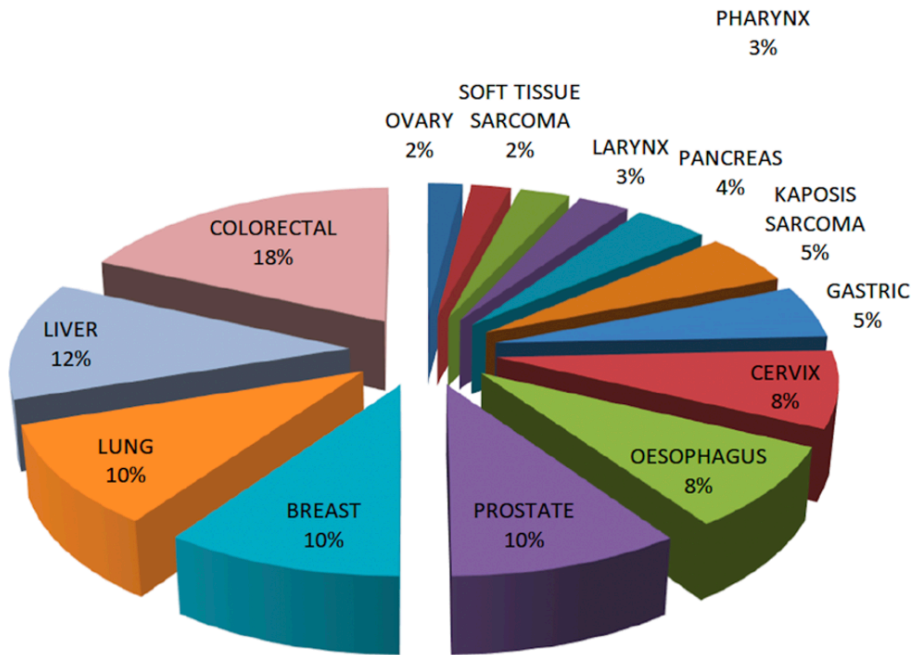


Figure 3. Cancer incidence from 2019 to 2021 as per the Muhimbili National Hospital cancer registry.

The COM-B Implementation Framework addressed capability challenges by restructuring physical space and building organizational and individual capacities. Opportunities for improvement were harnessed through collaborative initiatives, fostering cross-departmental collaboration, and a multidisciplinary approach. The motivation to address staffing and infrastructure challenges was evident in MNH's commitment to meeting the growing demand for cancer care.

Practical strategies, including a collaborative initiative, physical restructuring, cross-departmental collaboration, and proactive problem-solving, exemplify MNH's dedication to overcoming challenges and ensuring timely access to vital cancer treatments.

The program implementation phase focused on enhancing human resources at MNH, strategically addressing the shortage of clinical oncologists. A collaborative recruitment strategy, workforce expansion, and specialized expertise ensured the unit could diagnose and treat a wide range of conditions. Training initiatives for oncology staff, including continuous professional development and comprehensive training programs, underscore MNH's commitment to keeping the team updated with the latest advancements.

Expanding the nursing staff through a trainer approach optimized staffing levels, enhancing patient care, support services, and overall efficiency. The commitment to ongoing training and skill updates ensures that the oncology staff remains well-versed in contemporary practices.

Future Plans

The Adult Oncology Unit at MNH envisions establishing a robust research culture to contribute to the advancement of cancer care. This includes the development of a research agenda that explores the unit's impact, delving into qualitative and quantitative approaches. Patient testimonials and case studies will be incorporated to offer a humanized perspective on the oncology unit's influence. Longitudinal studies will be conducted to explore the long-term outcomes and quality of life for cancer survivors, providing valuable insights into the lasting impact of the unit. The unit also aims to scrutinize the contribution of increased expertise and facilities to early-stage cancer diagnosis, potentially influencing the overall cancer burden in Tanzania.

Evaluation Plan

Based on the logic model, the Adult Oncology Unit at MNH has identified relevant indicators for the evaluation plan. These indicators span across the implementation process, the unit's outcomes, and the impact on patients, MNH, and the nation as a whole. Using the RE-AIM framework, the evaluation will focus on implementation and sustainability to strengthen its external validity^[16]. Research methodologies, including direct observation, interviews, questionnaire administration, clinical chart reviews, and cost-effectiveness analysis, will be employed for comprehensive measurement. Tailored studies will evaluate the activities and outputs of the unit, the effectiveness of the strategy, and the impact on cancer treatment practices and the unit's resource utilization. This rigorous evaluation plan aims to provide a nuanced understanding of the unit's influence and effectiveness.

Conclusion

The establishment and development of the Adult Oncology Unit at MNH represent a strategic and comprehensive response to Tanzania's escalating cancer burden. Through active stakeholder involvement, adaptability, and a commitment to providing high-quality cancer care, MNH-Upanga stands as a model for successful oncology unit implementation. This model, characterized by collaboration, flexibility, and a multidisciplinary approach, can potentially influence cancer care initiatives not only within Tanzania but also in similar settings globally. As we move forward, a research agenda, evaluation, and monitoring will further illuminate the unit's impact, offering insights into its lasting influence on cancer care and patient outcomes.

Abbreviations

- COM-B: Capability, Opportunity, Motivation and Behavior
- MNH: Muhimbili National Hospital
- RE-AIM: Reach, Effectiveness, Adoption, Implementation, Maintenance

Statements and Declarations

Ethics

This report describes a service development and quality improvement initiative at Muhimbili National Hospital (MNH). Institutional ethical standards were followed in the reporting of this initiative, and all data presented were aggregated and anonymized (see Figure 3). While the project did not require full ethical review, formal permission to publish was granted by the Muhimbili National Hospital Research and Ethics Committee in alignment with institutional policy on non-research activities.

Data Availability

The aggregated data presented in Figure 3 were obtained from the Muhimbili National Hospital cancer registry. Due to institutional data protection policies and patient confidentiality, individual-level data are not publicly available. Requests for access to data may be made to the corresponding author or the Department of Research and Training at MNH and will be considered in accordance with institutional and ethical guidelines.

Author Contributions

Conceptualization, S.K.N. and A.S.; methodology, S.K.N.; validation, E.K. and L.K.; formal analysis, K.T. and P.M.; investigation, B.K. and D.M.; resources, C.P. and A.S.; data curation, D.M.; writing—original draft preparation, S.K.N.; writing—review and editing, all authors; visualization, S.K.N.; supervision, A.S. and C.P.; project administration, S.K.N.

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Declarations

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