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Perspectives and View Points

Patient Engagement and Radiotherapy Adherence in Low-middle Income Countries: A Narrative Review

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Introduction: As a cost-effective means of cancer control, radiotherapy forms a critical component of treatment for many cancers in low-middle income countries. However, its success largely depends on patient adherence. This review aimed to identify the major factors that affect radiotherapy adherence in these settings, and discuss possible means by which these may be addressed.

Methods: The Pubmed, Scopus, Web of Science, Cochrane Library, and BioMed Central databases were searched for articles pertaining to radiotherapy adherence in low-middle income countries, that were published within the last decade.

Results: Published data pertaining to radiotherapy adherence are largely lacking in these countries. However, the available data show that non-adherence has an adverse impact on cancer outcomes in these settings. Low radiotherapy capacity, inequitably distributed resources, access barriers, and financial constraints often disrupt adherence with planned radiotherapy schedules. Research pertaining to the major causes of non-adherence to radiotherapy in this setting indicates that they can be addressed by effective patient communication and engagement. Nevertheless, the potential of these basic approaches in improving outcomes remains largely underutilized.

Conclusions: Appropriate and timely policies for improving patient education and engagement may make a meaningful improvement in radiotherapy acceptance, and thereby cancer control, in these countries.

Introduction

Low-middle income countries (LMICs) are currently the major contributors to global cancer mortality, and their cancer burden is set to increase disproportionately over the next few decades [1]. Many common cancers in these countries continue to present at locally advanced stages, where radiotherapy forms an integral part of definitive treatment. In addition to being an indispensable component of treatment, radiotherapy is cost-effective and represents a practical means for achieving cancer control in these nations.

Despite the rising radiotherapy utilization rates in these settings, a considerable number of patients have no access to radiotherapy facilities in their own country [2]. In nations where radiotherapy services are available, there is a substantial gap in access and capacity; in this context, data indicate that less than 10% of megavoltage radiation units operating worldwide are installed in an LMIC [3, 4]. The increase in both population growth and cancer incidence poses an additional challenge to radiotherapy delivery. Overburdening of existing units increases the need for maintenance, and thereby costs; this is an area of particular concern in limited resource settings.

In addition to the low radiotherapy unit-to-population ratios, patients in these settings often face several barriers to access. These include resource constraints (including personnel and infrastructure), geographical barriers, and limited availability of funds. This has an adverse impact

on the radiotherapy access gap and utilization rates.

Notably, patients in these settings demonstrate considerable variation in the social determinants of health. Those with socioeconomic disadvantages, low education levels, poor social support networks, poor housing and food security, and limited access to transportation are at particular risk of poor treatment outcomes. Although the factors responsible for the disparities differ between countries and regions, they have a similar adverse impact on radiotherapy adherence and completion.

Low-middle income nations need to make a substantial amount of progress to achieve the United Nations sustainable development goals target for non-communicable diseases. These countries have a rising cancer burden, and radiotherapy forms the backbone of treatment for most common cancers in this setting. Additionally, many patients continue to present at locally advanced stages, where radiotherapy is essential. Palliative treatments also comprise a considerable proportion of the radiotherapy demand. It is therefore important that cancer facilities find cost-effective and efficient strategies to optimize resource utilization and maximize radiotherapy outcomes.

In view of the several barriers to care, patient attrition and non-adherence to radiotherapy schedules are not uncommon in low and low-middle income settings. As this has a definite adverse impact on radiotherapy outcomes, treatment adherence represents an actionable area for maximizing clinical benefit [5]. In the low resource scenario, interventions aimed at improving adherence potentially offer a resource-saving means of improving cancer outcomes. It is therefore important that the impact of non-adherence and contributory factors are evaluated, and potential strategies are identified for addressing this issue.

Impact of adherence on cancer outcomes

Studies indicate that treatment adherence is fundamental to successful cancer control [6-8]. In the context of radiotherapy, non-adherence has been found to have a definite impact on survival. In a large cohort that received external beam radiotherapy with curative intent, non-adherence led to a higher risk of death at one year after adjusting for potential confounding factors including age, gender, tumor site, and comorbidities [6]. In another study, non-adherence was associated with inferior recurrence-free and overall survival [7]; the authors concluded that non-adherence may be used as a marker to identify patients who are more likely to require additional interventions. A recent post hoc analysis from a randomized phase III trial found that treatment interruptions and unplanned breaks worsen locoregional failure-free, progression-free, and overall survival [8]. Treatment interruptions, unduly prolonged overall treatment times, and suboptimal total doses are therefore likely to affect cancer control. It is essential that factors responsible for non-adherence are identified in each setting to obtain maximal benefits from radiotherapy.

Causes of radiotherapy non-adherence in LMICs

Research on radiotherapy adherence in the LMIC setting found home-to-hospital distance, socioeconomic factors, longer treatment duration, and radiation toxicities to be major determinants of non-adherence [9, 10]. A higher proportion of patients present with locally advanced disease in these settings, and head and neck and cervical cancers form a substantial part of the workload in most radiotherapy departments. Definitive chemoradiotherapy regimens, extended radiation fields, and longer fractionation schedules are therefore commonly used. Larger fields and concurrent chemotherapy increase the risk of radiation toxicities. In areas with poor accessibility to radiotherapy services, longer fractionation schedules necessitate long-distance travel over a prolonged period. In addition, concurrent chemotherapy schedules are associated with additional out-of-pocket expenditure in many cases; this has substantial economic impact on families with

financial disadvantages. The out-of-pocket expenditure related to supportive care further worsens financial toxicity in many cases, prompting patients to discontinue treatment.

What can be done to address these issues?

As an essential component of treatment in many cases, radiotherapy plays a major role in cancer control. Although it is indispensable to the management of various cancers that are common in these settings, most LMICs continue to have low radiotherapy capacity. Appropriate cost-effective solutions therefore need to be identified to maximize radiotherapy outcomes.

Patient-centered care

In view of the difficulties that patients and their families experience, it is essential that healthcare facilities and caregivers are prepared to understand their concerns and address them appropriately.

Non-adherence owing to long home-to-hospital distances may be addressed using hypofractionated schedules where feasible; the frequency of administration of concomitant chemotherapy may also be reduced on a case-by-case basis. In families experiencing financial toxicity, it may be possible to understand the specific difficulties faced and address them through government schemes that offer financial and logistic support to patients in need; this will need to be individualized.

Multidisciplinary care

Radiation therapy and concurrent chemotherapy are associated with a unique set of toxicities which vary between cases. It is essential that patients and their families are adequately informed of the possible toxicities and their treatments. Prompt and appropriate management of individual toxicities may improve treatment tolerance, and thereby improve adherence. In this context, tolerance also depends on individual perceptions; certain patients with associated background factors including socioeconomic disadvantages, nutritional deficiencies, financial toxicity, and comorbidities may find radiation toxicities to be more unacceptable than others. It is therefore important that radiation oncologists, radiotherapists, and nurses are able to appropriately identify cues from patients and understand their problems on an individual basis. Collaboration among healthcare providers across specialties can ensure better delivery of comprehensive care that addresses the physical, emotional, and social needs of patients in these settings. This may reduce the likelihood of non-adherence due to unaddressed concerns or comorbidities, and thereby improve patient outcomes.

Improving patient communication

Recent studies that evaluated the causes of non- adherence in this setting indicate that despite barriers created by poor treatment accessibility and socioeconomic disadvantages, the responsible factors may be addressed via effective communication [9, 11].

Evidence suggests that patient communication has a definite impact on adherence to treatment, quality of life, and coping; effective communication also reduces procedure related pain and discomfort [12, 13].

Incorporating communication skills in medical curricula

The need for communication skills education is being increasingly recognized and incorporated into undergraduate medical curricula in these settings. Among trainees specializing in clinical oncology disciplines, this education needs to focus on empathetic communication and the unique challenges encountered in these settings. It is also important that trainees in other specialties (such as primary care or surgery) are informed of the basic mechanisms and potential side-effects of radiotherapy. Incorporating these basic areas in medical curricula can ensure more consistent and effective communication regarding the benefits and potential side effects of radiotherapy. This is can also increase appreciation of the unique needs of these patients, that are often overlooked in the absence of appropriate education. In the LMIC setting, trainees also need to be aware of the complex cultural and psychosocial associations that influence treatment acceptance; identifying and addressing these issues on an individual basis may improve treatment uptake. It is therefore essential that curricula, particularly at the postgraduate level, incorporate appropriate communication skills education. In view of the shortage of specialized staff, other healthcare providers including radiotherapists and nurses also need to receive appropriate communication skills education to address patients' needs on an as-needed basis.

Increasing patient engagement

The entire spectrum of cancer care revolves around the patient. Although patient-centered care has been recognized as a necessity for improving quality of care, patient engagement in treatment decision-making has been found to be consistently low in LMICs. Public engagement in healthcare research has also found to be lacking in these settings. The Choosing Wisely initiative aims to promote communication between patients and their physicians to help choose evidence-based and appropriate treatment. For this to succeed, it is important that medical education policies emphasize on developing skills that help build patient trust.

Improving patient education

Evidence suggests that adherence to cancer therapy is higher in informed patients [12, 14]. They are able to appropriately assess the quality of healthcare and have better treatment outcomes. Patients having appropriate knowledge about their condition and possible treatment options also have realistic expectations from their treatment, and are empowered to be responsible for their own health; this is likely to improve adherence. As an increasing number of patients in LMICs have access to digital technologies, policies directed at improving adherence through digital health solutions may provide a cost-effective means of improving outcomes.

In conclusion, published data pertaining to radiotherapy non-adherence and their impact on patient outcomes are largely lacking in low and low-middle income settings. However, the available data indicate that the efficient use of available resources and patient-centered care offer the best chances of cancer control in LMICs. Policies aimed at cancer control emphasize on issues related to universal coverage, allocation of resources, and equity; they also aim to increase funding for advanced radiotherapy infrastructure. However, it is important to appreciate the impact of effective communication and patient engagement on disease outcomes. Policies that prioritize patient-centered interaction may make a meaningful difference to radiotherapy outcomes and thereby cancer control in these countries.

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Competing interests

The author declares none

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