

Experiences of Patients using Thermoplastic masks for Radiotherapy of Head and Neck Cancers at Ocean Road Cancer Institute, Tanzania. A qualitative study.

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Received: March 31, 2022; **Published:** April 09, 2022

Abstract

Background: Head and neck cancer (HNC) patients undergoing radiotherapy (RT) require proper patient immobilization, for which a thermoplastic mask is used. Studies have reported a variety of patient experiences in using this device. Understanding these experiences in our local context is important to improve the current practice in the RT department. This study aimed at exploring the experiences of HNC patients using thermoplastic masks during RT at Ocean Road Cancer Institute in Dar es Salaam, Tanzania.

Methods: In-depth interviews were conducted in Swahili for thirteen purposively selected HNC patients who were undergoing RT treatment, using a semi-structured interview guide. Data were transcribed verbatim and translated into English and thematic analysis was done.

Results: There was a diverse understanding about thermoplastic masks among patients, and experiences of thermoplastic mask wearing varied, with patients expressing an experience of anxiety and discomfort during the first days of treatment and pain at later days of treatment.

Conclusion: Enhancing communication and ensuring the availability of staff numbers required during thermoplastic mask construction and treatment improves patients' understanding and comfortability as well as reduces anxiety. Also, regular assessment of pain and proper management of radiation-induced side effects among HNC patients is important during RT treatment.

Keywords: Head and neck cancer; Thermoplastic mask; Radiotherapy; Qualitative study

Abbreviations: HNC: Head and neck cancer; RT: Radiotherapy; ORCI: Ocean Road Cancer Institute; RTT: Radiation Therapist; IDI: In-depth interview

Introduction

Head and neck cancers (HNCs) are a group of cancers that arise in the mucosal surfaces lining of the aero-digestive tract, in which more than 90% are squamous cell carcinoma [1]. In managing HNCs, radiotherapy (RT) is one of the key treatment modalities that is given either alone or in combination with surgery and chemotherapy depending on the tumour stage and the patient's condition [2].

The administration of RT for HNCs requires proper patient immobilization in which a thermoplastic mask is used. The thermoplastic mask is made of thermoplastic material which, once heated, becomes flexible to give it the property to conform to the patient's anatomy, and stiffens upon cooling [3]. This immobilization device helps to reproduce patient treatment setup on the daily basis of treatment delivery [4,5].

HNC patients undergoing RT report various experiences of thermoplastic mask use as an immobilization device during treatment delivery. Anxiety is a common experience among HNC patients who use a thermoplastic mask during RT which can affect treatment delivery by interrupting treatment sessions [6, 7]. During thermoplastic mask wearing, a patient can also experience comfortability challenges and pain due to the contact that the thermoplastic mask makes with the irradiated area.

Thermoplastic masks are routinely used during RT delivery to immobilize HNC patients. The experiences of their use in the Tanzania oncology settings have not been explored. This study explored the experiences of HNC patients of using thermoplastic masks during RT treatment at Ocean Road Cancer Institute (ORCI) in Dar es Salaam, Tanzania.

Materials and Methods

Study design

A qualitative exploratory study design was used for this study. This design offered in-depth information about patients' experiences [8]. The qualitative approach provided the authors with a wide range of flexibility to probe patients' responses and gave patients the freedom to respond in their own words about their experiences on the routine use of thermoplastic masks.

Study setting

This study was conducted at ORCI in Dar es Salaam which is a major public oncology Institution in Tanzania that offers

comprehensive cancer care. Three-dimensional (3D) conformal radiotherapy technique is used for the treatment of HNCs which is delivered with 6MV photons. This is usually given concurrently with chemotherapy drugs before the delivery of the RT fraction.

A thermoplastic mask is prepared in a well-equipped mould room by a Radiation Therapist (RTT), a responsible staff for accurate thermoplastic mask construction and ensuring it fitted well the patient during treatment. Patients are fitted with their thermoplastic masks and required to have them on during the entire length of treatment which may last for a maximum of 5 minutes each day. The total number of days of treatment is 33 for curative RT (66Gy in 33 fractions, 2Gy per fraction) and 30Gy in 10 fractions or 20Gy in 5 fractions for palliative RT.

Study participants and Recruitment

Study participants were HNC patients immobilized by thermoplastic masks during RT. A purposive sampling strategy was used to recruit patients undergoing RT treatment. We conducted in-depth interviews (IDIs) with thirteen (13) HNC patients, of whom 8 were males and 5 were females. Patients' ages ranged from 24 to 72 years. The majority of the patients (61.5%) had attained primary education level and were married.

Data collection

13 IDIs were conducted on HNC patients who gave informed consent after a detailed description of the study. Interviews were conducted in Swahili, the local language, using a semi-structured interview guide. The guide contained questions that were constructed based on the experiences of the authors and literature on HNC patients' experiences of thermoplastic mask use followed by probe questions to bring about more in-depth responses from the patients (Table 1). Interviews were audio-recorded to gather all information provided by patients and notes were taken using notebooks to get some non-verbal data that was missed from the recorder.

The principle of data saturation was used to determine the sample size for this qualitative study. This means, the sample size was not predetermined, instead, the interviews stopped when the researchers noticed the repetition of the earlier gained information with little or no new insight in regards to the research questions [9].

| In-depth interview guide questions |
|--|
| 1. Please tell us what do you understand about a thermoplastic mask (Probe: The use of a thermoplastic mask, is there a possibility to be treated without a thermoplastic mask and why?) |
| 2. Please tell us the information you received about a thermoplastic mask in a mould room (Probe: What were you told about a thermoplastic mask? Were you satisfied with the information received? Staff cooperation?) |
| 3. What was your experience of thermoplastic mask use during the first treatment session? (Probe: Patient comfortability, feeling anxious, feeling pain and Other experiences) |
| 4. What was your experience of thermoplastic mask use after the first treatment session onward? (Probe: Patient comfortability, feeling anxious, feeling pain and Other experiences) |

Table 1: Interview guide questions used during the IDIs.

Data analysis

Interview transcripts were transcribed verbatim for analysis. The Swahili transcripts were then translated into the English language. Thematic analysis was used to analyze the collected information from the patients as described in different studies [10, 11]. Data were manually analyzed by the first and second authors by reading and re-reading the transcripts for a better understanding of the emerging ideas. Codes, sub-themes, and themes were agreed upon by all authors and presented with the support of succinct quotes.

Results

The findings of the study are presented based on four generated subthemes that were grouped into two main themes, namely patients' understanding about thermoplastic masks and experience of thermoplastic mask wearing. Table 2 shows a summary of the findings.

| Selected codes | Sub-themes | Themes |
|--|--|---|
| • Patient hesitancy to ask for information | Poor understanding about thermoplastic masks | Patients' understanding about thermoplastic masks |
| • Shortage of staff during thermoplastic mask preparation | | |
| • Use of technical terms during thermoplastic preparation | | |
| • Good staff cooperation during mask preparation and treatment | Good understanding about thermoplastic masks | |
| • Use of polite words during communication | | |
| • Provision of adequate information to the patients | | |
| • Initial experience of thermoplastic mask anxiety | Early experience of thermoplastic mask wearing | Experience of thermoplastic mask wearing |
| • First day experience of discomfort | | |
| • The thermoplastic mask was painless in the earlier fractions | | |
| • Later days the pain was experienced due to side effects | Late experience of thermoplastic mask wearing | |
| • Reduction in anxiety as a result of coping with a thermoplastic mask | | |

Table 2: Summary of findings.

Patients' understanding about thermoplastic masks

Patients' understanding about thermoplastic masks was varied; some reported a good understanding while others had a poor understanding about a thermoplastic mask.

Poor understanding about the thermoplastic mask was contributed by a patient hesitancy to ask for information. Most of the patients never ask anything because they trust the staff working in the RT department as shown below.

"I don't understand anything. The day I came we went to a special room for thermoplastic mask construction, there they started moulding the mask and placing it on my face. During treatment, they fitted it to fix my head" (Patient 4).

Shortage of staff compromised information satisfaction, especially during thermoplastic mask preparation where the information is highly required as the patients are there for their first visit.

"Only one staff constructed my mask" (Patient 12).

Also, the use of technical terms limits information exchange between staff and patients. This stops patients from asking more questions, especially those who are less communicative. There is a commonly used technical term in the Swahili language saying, “Tunakuwekea alama”, which simply means pre-treatment preparation. This is just a technical term used in the department that does not satisfy the patient because they are supposed to know every step of what is going on as stated by one of the patients.

“Sure I wasn’t satisfied with the instructions that I was given. One day I asked the staff if that is the treatment (during thermoplastic mask construction), he told me, today we are preparing your treatment (‘tunakuwekea alama’ in Swahili)” (Patient 9).

Other patients had a good understanding about thermoplastic masks. This was contributed by cooperative staff who facilitated satisfactory information exchange.

“I liked the way staff showed cooperation to me” (Patient 1).

The use of polite words during communication has a great contribution to patients’ understanding. The way staff receive the patient and talk to the patient matters to the patient’s understanding and gives the patient freedom to ask more questions.

“Staff cooperation was good and I am glad for that because they used polite words during our talks. We value the staff who are there to help us” (Patient 2).

Experience of thermoplastic mask wearing

We noted a spectrum of patients’ experiences of thermoplastic mask wearing which showed initial and delayed experiences. Most patients experienced anxiety and discomfort during the first days of treatment and pain at the later days of treatment due to the radiation-induced side effects. There was a decrease in thermoplastic mask anxiety as treatment fractions proceeded.

Patients experienced anxiety during thermoplastic mask wearing, especially in earlier days due to the initial unfamiliarity and lacking information about the device, which later on reduced as the patients learnt to cope with the situation.

“I experienced anxiety during the first days of treatment because it was a new thing to me. Now, I see it as a normal thing” (Patient 7).

Patients described that the comfortability of thermoplastic masks varies day to day; this has been mostly observed in the earlier fractions because of tightness and compression.

“I felt uncomfortable in the first days of treatment because a thermoplastic mask was very tight” (Patient 8).

Patients reported pain when a device touches the irradiated area at the time of treatment delivery. This is seen when patients start experiencing radiation-induced side effects during treatment.

“I start experiencing pain after the onset of radiation-induced side effects. When the thermoplastic mask touches and compresses the irradiated area it becomes painful. Earlier, the mask fitted me well without any pain” (Patient 11).

Discussion

This study has explored HNC patients’ experiences of thermoplastic mask use during RT. We found that Patients had a diverse range of understanding about the thermoplastic mask, which was negatively influenced by patient-related (hesitancy to ask for formation) and staff-related (staff shortage, use of technical terms during communication) factors. Improved patient understanding about the device was linked to good staff cooperation and enhancing communication. Anxiety and discomfort were the early experiences while the pain was experienced after the onset of the side effects.

In this study, patients showed to trust the staff and do not feel they need to ask for more information. It is usually the staff who initiates conversation, otherwise, patients typically remain silent. This finding is consistent with a study by Keast et al. that reported various desires for information by patients in which some patients trusted that staff will communicate to them what they desired to know [12]. This situation puts an obligation on staff to provide patients with all the necessary information from the start of the RT process.

Our study has revealed a shortage of staff during thermoplastic mask construction which contributed to patients’ poor understanding. Two to three RTTs have been recommended to be involved in the construction of a thermoplastic mask in a mould room depending on the site of the disease [4]. This will not only ensure accurate preparation of a thermoplastic mask but also provide room for information delivery to patients.

The use of technical terms or medical jargon by staff in a department was mentioned by patients as a reason for the poor understanding of instructions and information. We know that 'medical jargon' is routinely used in our department for cancer patients undergoing computed tomography (CT) simulation for RT treatment. Unfortunately, this compromises a patient's right to complete information by assuming that the patient is already conversant with the subject. To ensure patients' understanding, staff can find the best way to communicate with patients in such a way that they can understand [13].

Friendly and cooperative staff can contribute to patients' understanding by facilitating access to information and familiarity with the RT process. The use of good communication skills is crucial to satisfactory information exchange however, this information needs to be customized to a specific patient as they differ in background characteristics such as age and level of understanding in terms of information satisfaction [14, 15]. The presence of educational materials in the department that contains details of RT procedures is a good source to meet patients' need for information [16]. If properly provided, information improves patients' treatment outcomes [17].

Patients mentioned experiencing anxiety associated with thermoplastic masks, especially during the earlier days of treatment. This affects the treatment outcome as it may reduce compliance or interrupt treatment sessions, however, anxiety usually tends to decline as treatment sessions continue. Studies have explained that anxiety is common to cancer patients in which provision of adequate information and education helps to reduce anxiety for anxious patients and improves patient understanding [18, 19].

This study has also observed the experience of discomfort among patients, a finding that has been reported in another study among HNC patients [20]. This discomfort is due to the tightness of the mask which can restrict patient vision, swallowing and impair breathing which was also reported by Goldsworthy et al. [21]. Several factors contribute to these comfortability challenges including incorrect preparation, and improper placement of thermoplastic mask on the patient's face as well as the long waiting time between CT simulation and treatment delivery. Staff commitment and reducing waiting time can help to improve comfortability.

A significant number of patients felt pain when the thermoplastic mask touches the irradiated area. This is seen when patients start to experience radiation-induced side effects which usually begin

two weeks from the start of RT. However, the onset and severity of the side effects depend on the radiation dose, treatment technique used and treatment site [22]. The thermoplastic mask has been reported to be a potential contributor to skin reactions resulting from their tendency of maximizing skin doses which with time inflict skin desquamation [23]. Despite being managed while treatment continues, there is still a need to routinely ask patients if they feel pain when using thermoplastic masks.

Conclusion

Patient hesitancy to ask for information, shortage of staff and use of technical words were the major contributors to a poor understanding about a thermoplastic mask by HNC patients at ORCI. Enhancing communication and ensuring the availability of staff numbers required during thermoplastic mask construction and treatment improves patients' understanding and comfortability.

Anxious patients can be identified early in the RT workflow and provided with information and support to improve their experience. Regular assessment of pain and proper management of radiation-induced side effects among HNC patients is important during RT treatment.

Declaration

Ethical considerations

The Institutional Review Board of the Muhimbili University of Health and Allied Sciences granted ethical approval for this study. This study also obtained permission to be conducted at ORCI from the Institute Academics, Research, Publications, and Ethical Committee of ORCI.

Acknowledgements

We would like to thank all patients who agreed to participate in the study and the research assistants. We also thank the Muhimbili University of Health and Allied Sciences for supporting and providing approval for this study as well as ORCI administration for allowing us to conduct this study.

Conflict of interest

The authors declare that there are no conflicts of interest.

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