

## Event of Nasopharyngeal Carcinoma in Coastal Area: Review Article

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### ABSTRACT

**Introduction:** Communities in coastal areas have a high level of consumption of salted marine products, such as salted fish. Consuming salted fish is one of the factors causing the incidence of nasopharyngeal carcinoma (NPC).

**Content:** NPC is a type of cancer found in the head and neck that can be caused by various factors, such as smoking, formaldehyde exposure, and consumption of salted fish. Clinical manifestations can arise in the patient's NPC, such as epistaxis, nasal congestion, ringing in the ears, headaches, facial pain, and visible lumps

**Conclusion:** NPC is a type of cancer found in the head and neck that can be caused by various factors, such as smoking, formaldehyde exposure, and consumption of salted fish. Clinical manifestations can arise in the patient's NPC, such as epistaxis, nasal congestion, ringing in the ears, headaches, facial pain, and visible lumps

**Keywords:** Nasopharyngeal carcinoma; coastal area; salted fish



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## Introduction

Indonesia is an archipelagic country that stretches from 60 North Latitude to 110 Latitude and 920 to 1420 East Longitude with a coastline of 81,000 km most of Indonesia's area is an ocean, so most of the area is an ocean. Most of Indonesia's territory consists of the coast.<sup>2,12</sup> Indonesia is a country consisting of islands and oceans that are rich in potential natural resources.<sup>2</sup> Abundant marine products make the Indonesian people empower fish catches into long-lasting salted fish processed foods. In research (Rusliafa, Amiruddin, and Noor, 2014), it has been found that people living in coastal areas have a higher level of sodium consumption due to the consumption of salted seafood compared to people living in the mountains. Eating salted foods, such as salted fish, is one of the factors causing the incidence of nasopharyngeal carcinoma.<sup>7,8</sup>

Nasopharyngeal carcinoma (NPC) is a type of cancer found in the head and neck.<sup>9</sup> NPC is the fourth most common malignant tumor in Indonesia after cervical cancer, breast cancer, and skin cancer.<sup>15</sup> Meanwhile, in the world, Indonesia ranks third for NPC cases with the highest number of occurrences. NPC originates from the epithelial surface of the nasopharynx, precisely in the narrow gap behind the nasal cavity above the back of the throat (Rossmuller fossa). Nasopharyngeal carcinoma, previously known as lymphoepithelioma.<sup>9</sup>

Besides being caused by fish consumption, this malignancy can also be caused by various factors, such as viruses, genetics, and environmental factors.<sup>1</sup> Among these factors, the consumption of salted fish is the most common cause of NPC due to its association with carcinogenic substances.<sup>7</sup>

## Epidemiology

Nasopharyngeal carcinoma is an endemic disease in certain regions of the world, especially in Southeast Asia. According to data from the *World Cancer Research Fund International* (WCRFI), there were more than 133,000 new cases of nasopharyngeal cancer in 2020 with an average recorded prevalence of 1.5/100,000. Indonesia ranks third with the highest nasopharyngeal carcinoma in the world with an incidence of 6.8/100,000 people or there are 19,943 new cases of NPC every year. Meanwhile, the mortality rate of NPC in the world is 80,000 cases or there are 0.9/100,000 cases of death due to NPC in 2020. Indonesia ranks second highest after Brunei Darussalam with a prevalence of 0.9/100,000 or there are 13,399 deaths due to NPC in 2020.<sup>14</sup>

## Risk Factors

NPC cases are most commonly found in men compared to women in the 45-55 year age group.<sup>10</sup> According to research from (Tsao et al., 2014) states that male sex is 2-3 times more at risk of suffering from NPC compared to women.<sup>13</sup> Based on data from *Global Cancer Statistics* (GLOBOCAN) 2020, also stated that NPC in men was 3 times more than the number of NPC cases in women with a total of 96,371 new cases

in men and 36,983 new cases in women.<sup>11</sup> Age factors also increase the risk of this NPC incident. NPC cases began to increase in the population aged 30 years and cases peaked in the 40-60 year age group. After reaching the age of 60 years, the incidence of NPC began to decrease.<sup>5,13</sup>

Apart seen from age and gender, NPC cases are also often found in people with high consumption of salted fish.<sup>4</sup> In the study of Kasim and his colleagues, it was found that most of the NPC patients at Abdul Moeloek Hospital Bandar Lampung often consumed salted fish with a frequency of > 3 times a month.<sup>4</sup> Consumption of salted fish increases the risk of NPC because there are carcinogenic substances, namely nitrosamines that are in salted fish.<sup>3</sup>

### **Etiopathophysiology**

This malignancy can be caused by various things, such as the interaction of environmental factors, genetic structure, and viral infections such as the Epstein-Barr virus, radiation exposure, nutritional deficiency, or a decrease in the immune system.<sup>9</sup> Environmental factors that can cause the incidence of NPC are environments that have a population of both passive and active smokers, formaldehyde exposure, and consumption of salted fish.<sup>3</sup> In endemic areas, there are many foods with high salt content, for example, salted fish, which contain nitrosamines and nitrites that trigger NPC events. The active carcinogenic ingredient of nitrosamines can cause DNA damage and chronic inflammation of the nasopharyngeal mucosa. Meanwhile, natural nitrites are not carcinogenic but will become carcinogens in the endogenous nitrosation process. Endogenous nitrosation occurs when nitrites react with amides and secondary amines to produce nitrosamides and nitrosamines which are active carcinogenic agents. Consuming these carcinogenic foods during childhood leads to the accumulation of genetic lesions as well as the development of cancer in the nasopharynx causing the occurrence of NPC.<sup>6,13</sup>

### **Clinical Manifestations**

Mostly, NPC appears in the fossa of Rosenmuller and spreads intracranially or locally as a mass in the head. Based on the anatomical location, NPC has 4 main symptom groups; namely first, nasal symptoms such as epistaxis, nasal obstruction, and rhinorrhea; second, ear symptoms such as ear fullness, hearing loss, and ringing in the ears (tinnitus) associated with eustachian tube dysfunction due to lateral-posterior tumor expansion; third, cranial nerve palsy due to tumor expansion into the para cavernous sinus which causes disturbances in N 3, 5, 6, and 12. Clinical manifestations that appear in this third group, namely patients complaining of headache, eye movement disorders, diplopia, swallowing disorders, facial pain, and facial numbness; Fourth, neck symptoms, the manifestation of which is usually the patient presents with a complaint of a lump or enlargement of the lymph nodes at the top of the neck and there can be a mass in the rosenmuller fossa with posterior rhinoscopy examination. NPC patients can experience one or more of these 4 groups of symptoms.<sup>1</sup>

## Classification

In determining the staging of NPC can use the *American Joint Committee on Cancer (AJCC) 2017* or the 8th edition of the TNM classification system as described in the following table.<sup>9</sup>

**Table 1. Nasopharyngeal Carcinoma Classification System based on TNM Stage 8th edition/ AJCC 2017.<sup>9</sup>**

Primary Tumor (T)	
TX	Primary tumors cannot be graded
T0	No tumor was identified, but cervical node involvement is EBV positive
T1s	Carcinoma <i>in situ</i> , there is no invasive tumor
T1	Tumor confined to the nasopharynx, oropharynx, or nasal cavity without para pharyngeal extension
T2	Tumor with extension to the para pharynx, involvement of surrounding soft tissues (medial pterygoid, lateral pterygoid, prevertebral muscle)
T3	Tumor with infiltration of bony structures at the base of the skull, cervical spine, and/or paranasal sinuses
T4	Tumor with intracranial extension, involvement of cranial nerves, hypopharynx, orbit, parotid gland, and/or extensive soft tissue involvement across the lateral surface of the lateral pterygoid muscle
Regional lymph nodes (N)	
NX	Regional lymph nodes cannot be assessed
N0	No regional lymph node metastases
N1	Unilateral or bilateral or unilateral metastases to cervical and/or cervical lymph nodes, metastases to retropharyngeal lymph nodes, < 6 cm, above the caudal border of the cricoid cartilage
N2	Bilateral metastases to cervical lymph nodes, < 6 cm, above the caudal border of the cricoid cartilage

N3	Unilateral or bilateral metastases to cervical lymph nodes, > 6 cm, and/or spread below the caudal margin of the cricoid cartilage
<b>Metastatic (M)</b>	
M0	No distant metastases
M1	There are distant metastases
<b>Stage Grouping</b>	
Stage 0	T1s-N0-M0
Stage I	T1-N0-M0
Stage II	T1-N1-M0 and T2-N0, N1-M0
Stage III	T1, T2, T3-N2-M0 and T3-N0, N1, N2-M0
Stage IVA	T4-any N-M0 and Any T, N3-M0
Stage IVB	Any T-any N, M1

## Management

Treatments that can be used to treat NPC include radiotherapy, chemotherapy, and surgical intervention. The main treatment that can be done in dealing with NPC is radiotherapy. Radiotherapy is effective in all cases of NPC except in cases of NPC that have distant metastases. While chemotherapy treatment is usually done together with radiation at an advanced stage. Chemotherapy can also be done in cases of NPC that have metastasized far. When radiotherapy and chemotherapy are unsuccessful and relapse occurs, surgical intervention can be used as a salvage option.<sup>9</sup>

## Conclusion

Nasopharyngeal carcinoma (NPC) is a type of cancer found in the head and neck. NPC is the fourth most common malignant tumor in Indonesia after cervical cancer, breast cancer, and skin cancer. This malignancy can be caused by various things, such as the interaction of environmental factors, genetic structure, and viral infections such as the Epstein-Barr virus, radiation exposure, nutritional deficiency, or a decrease in the immune system. NPC cases are most commonly found in men compared to women in the elderly age group, in the range of 45-55 years. Several treatments such as radiotherapy, chemotherapy, and surgical intervention can be done to treat NPC cases.

### Conflict of Interest

There is no conflict of interest

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