

Perspective

Editorial Process: Submission:12/01/2026 Acceptance:21/10/2026 Published:25/10/2026

Closing the Screening Gap: A Perspective on Nasopharyngeal Carcinoma in First-Degree Relatives in North Sumatra, Indonesia

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Abstract

Objective: Indonesia ranks second in the world in NPC incidence and mortality after China. Screening high-risk populations, particularly first-degree relatives of patients, is important to reduce NPC morbidity and mortality. However, gaps in cancer screening remain in Indonesia, including in North Sumatra. Although NPC is a malignant disease with a clear geographic distribution and evidence of an association between NPC incidence and ethnicity, there have been no studies on NPC screening and its application to first-degree relatives in North Sumatra. **Methods:** This perspective reviews factors influencing the limitations of NPC screening, including suboptimal screening methods, patient and healthcare professional awareness and knowledge regarding NPC, and a suboptimal cancer registry. **Results:** Given the evident ethnic influence on NPC, it is important to explore the unique genetic and environmental interactions within each ethnic group or region to determine appropriate screening methods. In high-risk regions like North Sumatra, more studies on risk-based screening, outreach to increase awareness and knowledge among patients and healthcare workers, and support for health policies are needed to reduce NPC morbidity and mortality. **Conclusion:** A future direction for this improvement is the implementation of a national screening program, as has been implemented in China.

Keywords: First-degree Relatives, High-risk Region, North Sumatra, NPC, Screening

Asian Pac J Cancer Prev, 27 (10), 3513-3515

Introduction

Nasopharyngeal carcinoma (NPC) is rare globally but common in certain regions, including Southeast Asia [1]. NPC ranks sixth among the most prevalent cancers in Indonesia, with relatively high mortality rates. In addition, Indonesia ranks second in the world for the highest incidence and mortality of NPC [2]. Early diagnosis is necessary to reduce mortality, and this may be achieved through screening of individuals with a family history of NPC [3, 4]. Studies have been conducted on NPC screening in patients' first-degree relatives, but none have been done in North Sumatra, despite this region being considered high-risk. This perspective aimed to present a summary of evidence related to the gap, as well as the challenges and opportunities for screening in first-degree relatives of NPC patients in North Sumatra.

The Significance of NPC Screening in First-Degree Relatives

Family history is correlated with a greater risk of NPC due to its genetic link. Genetic causes differences in NPC incidence rates geographically, where specific allele variants in certain ethnicities are the key to NPC pathogenesis [5]. The role of genetics in geographic variation in NPC incidence is associated with the genetic variant hypothesis. Some rare genetic variants may be the cause of NPC found in certain families or populations [6].

Furthermore, the existence of two different peak age patterns, which is 15-24 years and 65-79 years, suggests the possibility that genetic factors play a major role in the occurrence of NPC in populations with low incidence rates, while the combination of genetics with lifestyle and eating habits plays a role in populations with high incidence rates [5]. Studies also show that the risk of NPC remains even when adjusting for EBV antibody levels

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and smoking history, indicating a major genetic role in NPC [7].

Challenges of NPC Screening in Indonesia

The constant problem of NPC disease globally is the delay in diagnosis which can be in the form of the patient delay, doctor delay, or system delay. The symptoms of NPC in its early stage are mostly not specific to the disease which causes misleading both in patients and the doctors that affects the diagnosis delay [8, 9]. The trickiness in diagnosing NPC at its early stage and the awareness of the patients, doctors, and community to the early detection leads to the diagnosis delay [10].

The implementation of NPC screening is still limited to certain areas, especially the endemic regions. NPC screening had been done in China using IgA antibodies against EBV antigens such as including capsid antigen (VCA), early antigen (EA), and nuclear antigen 1 (EBNA1). However, the best and superior screening method has not yet been discovered. Screening tools for NPC have been developed until now, but there are still limitations such as low positive predictive value and the feasibility to be applied in the communities [11].

To date, there is no national screening program for nasopharyngeal cancer in Indonesia. However, the national screening program does not guarantee the achievement of the goal of early detection. Data shows that national coverage for cervical and breast cancer screening in Indonesia remains below the Ministry of Health and WHO targets. The failure to achieve the target is influenced by various factors such as the availability of screening in health facilities, the number of general practitioners, the number of service providers, the number of non-communicable disease posts, and even regional income. Health literacy of the patients and their families also influences screening coverage [12].

The Gap of NPC Screening in North Sumatra

Until this perspective is written, there has been no study about screening NPC in first-degree families of patients in North Sumatra. North Sumatra is a province in Indonesia that is also inhabited by various ethnic groups with different customs or cultures, which can be related to NPC carcinogenesis [5, 13]. In Marlinda's study, the Batak tribe, which is the largest tribe in North Sumatra, was ranked third in the number of NPC patients in Jakarta [14].

Information regarding the distribution of NPC patients based on ethnicity in North Sumatra is still minimal. However, based on the author's observations in the field, one of the ethnic groups other than the Batak, which is also quite often found to suffer from NPC, is the Nias tribe. The study found that in the Nias tribe, there was a genetic pattern in the form of less genetic diversity and an excessive frequency of ROH. This genetic pattern is related to the risk of cancer [15, 16]. The limitations of studies regarding the incidence patterns of NPC based on ethnicity warrant further research. Understanding the key factors contributing to NPC development in the region will aid the development of appropriate screening methods.

Unlike other regions, data for Indonesia is not found in the Cancer Incidence in Five Continents" Volume

XII report by the International Agency for Research on Cancer (IARC) Scientific Publications. Incomplete cancer registration for Indonesia implies that accurate data on NPC incidence and disease burden estimates remain unclear. Furthermore, determining appropriate screening methods is difficult due to the limited evidence-based studies [17].

Discussion

The gap in nasopharyngeal carcinoma screening in North Sumatra reflects the suboptimal cancer registry in Indonesia and the lack of effective and appropriate screening methods. China, the country with the highest incidence and mortality rates from NPC in the world, has implemented a screening program for NPC in high-prevalence areas, particularly in Southern China. The screening approach may serve as a benchmark for Indonesia, as the country ranked second after China in incidence and mortality from NPC. However, the cancer registry and studies on NPC screening still need to be optimized so that implementation is effective and targeted.

In conclusion, the gaps for NPC screening in North Sumatra, as a high-risk region of NPC in Indonesia, are due to a suboptimal cancer registry. Therefore, it limits the capacity to find appropriate screening methods. The authors suggest that optimizing the cancer registry and expanding studies on NPC screening in first-degree relatives is necessary to reduce morbidities and mortalities.

Author Contribution Statement

FF: Conceptualization, Writing-original draft; LCW: Conceptualization, Supervision; INDL: Conceptualization, Supervision; AY: Investigation; JC: Conceptualization; ERD: Conceptualization; RPS: Resources, Writing-review and editing.

Acknowledgements

Funding Statement

This work was supported by the International Collaboration Research (University of Sumatera Utara-Singhealth Duke-NUS Global Health Institute / USU-SDGHI) under Grant [number 20280/UN5.1.R/PPM/2023].

Conflict of Interest

The authors declare no conflicts of interest.

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