INTERNATIONAL JOURNAL OF SOCIAL HEALTH
https://ijsh.ph/index.php/rp
Volume 4 Number 8 August 2025
E-ISSN: 2984-7079

The Relationship of Age and Gender with the Histopathological Type of Nasopharyngeal Carcinoma at Gunung Jati Hospital, Cirebon

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KEYWORDS
Nasopharyngeal carcinoma, age, sex, histopathology

ABSTRACT
Nasopharyngeal carcinoma (NPC) is a type of cancer that appears in the nasopharynx, which is the area behind the nose and above the throat. Nasopharyngeal carcinoma occurs 2 to 3 times more often in men compared to women, with a higher incidence in the 50-59 age group. The research aims to determine the distribution and analyze the relationship between age and sex with the histopathological picture of nasopharyngeal carcinoma at Gunung Jati Cirebon Hospital. The research used a cross-sectional design. Sampling was carried out using secondary data with a total sampling approach, involving 51 respondents. Univariate analysis was used to look at the distribution of age, sex, and histopathological type, while bivariate analysis was performed using the Chi-Square test. Research Results show of the 51 respondents, 13 (27.08%) were in the age group of 51-60 years, with a p-value of 0.471. In addition, 35 respondents (72.92%) were male, with a p-value of 0.814. All 51 respondents (100%) had the most common type of histopathology, non-keratinized squamous cell carcinoma, with the majority being undifferentiated non-keratinized. This study did not find a significant association between age and sex with the histopathological type of nasopharyngeal carcinoma in patients

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INTRODUCTION

Nasopharyngeal carcinoma (NPC) is a type of cancer that appears in the nasopharynx, which is the area behind the nose and above the throat. Formerly known as *lymphoepithelioma*, NPCs originate from nasopharyngeal epithelial cells and are the most common malignancies in this area (Suyuti, 2017). Globally, NPC is rare; the age-standardized rate is generally less than 1 case per 100,000 person-years. However, significant increases have been observed in the southern regions, particularly among the Chinese population, especially the Cantonese, where the incidence ranges from 25 to 50 cases per 100,000 people per year. The lowest rate is reported in the European population. In Indonesia, the incidence rate is much higher, at 5.7 cases per 100,000 males and 1.9 cases per 100,000 females, compared to the global rate of 1.9 cases per 100,000 males and 0.8 cases per 100,000 females (Zhang et al., 2023) .

The NPC death toll remains significant. In 2012, NPC accounted for 50,831 deaths worldwide, with men disproportionately affected (35,756 male deaths compared to 15,075 female deaths). A male-to-female mortality ratio of 2.37 suggests that males have a much higher risk of death from NPC. In Indonesia, 7,391 deaths due to NPC were reported in the same year. The risk of death from NPC increases with age, especially after age 45 in men and after age 55 in women (Yousefi et al., 2018).

The cause of NPC is multifactorial, involving a complex interaction between genetic predisposition and Epstein-Barr virus (EBV) infection. EBV, a human herpesvirus that infects 90% of the world's adult population, has been classified by the International Agency for Research on Cancer (IARC) as a Group 1 carcinogen due to its association with nasopharyngeal carcinoma. Lifestyle factors such as smoking also contribute to the risk of NPC (Young & Dawson, 2014). In Indonesia, the prevalence of smoking is increasing, with an estimated 70 million active smokers, including 7.4% of those aged 10–18 years (Rokom, 2024).

NPC occurs two to three times more often in men than in women. This variation may be due to differences in lifestyle factors (such as tobacco use) or biological factors. The incidence peaks in individuals aged 50–59 years, likely due to prolonged exposure to carcinogens. Environmental factors—such as the consumption of salted fish containing nitrosamines—have been associated with the development of undifferentiated subtypes of non-keratinized carcinoma, which are often observed in Southeast Asia (Yousefi et al., 2018).

Histopathological subtypes play an important role in determining prognosis. Patients with non-keratinized carcinoma, especially undifferentiated subtypes, generally have a better prognosis compared to those with keratinized squamous cell carcinoma, which tends to be more aggressive and less responsive to treatment (Pan et al., 2020).

Previous studies on nasopharyngeal carcinoma (NPC), such as those conducted by Zhang et al. (2016), discuss the causes of NPC, including Epstein-Barr virus (EBV) infection and genetic factors, but do not provide in-depth analysis of histopathological differences or the influence of local lifestyle factors such as smoking and the consumption of nitrosamine-containing salted fish, which are common in Southeast Asia. Similarly, Chen et al. (2018) examined the prevalence of NPC across various regions, but their research did not explore the specific factors such as age, gender, and histopathological differences in patients treated in Indonesian hospitals.

The purpose of this study was to determine the relationship between age, sex, and histopathology of nasopharyngeal carcinoma in patients who received treatment at *Gunung Jati* Hospital, Cirebon. By understanding these relationships, the study hopes to contribute to a more targeted approach to the diagnosis and treatment of NPC, which may ultimately improve patient treatment outcomes. The benefits of this research include providing valuable insights into the management of NPC in Indonesia, especially considering the unique local risk factors, and contributing to improved patient outcomes through a more individualized and data-driven approach.

METHOD

This study uses a descriptive analytical method with a cross-sectional approach. This design was chosen because it is in accordance with the purpose of the research, which is to see the distribution and correlation of the variables studied. Data for this study were collected through secondary sources, specifically from the medical records of nasopharyngeal carcinoma patients at *Gunung Jati* Cirebon Hospital for 2022–2023. No questionnaires or direct

observations were used. The authors collected demographic information (age, sex) and histopathological examination results from patients' medical records.

The target population includes all patients diagnosed with nasopharyngeal carcinoma at *Gunung Jati* Cirebon Hospital, while the accessible population consists of nasopharyngeal carcinoma patients who are treated at the *ENT* polyclinic and undergo histopathological examinations at *Gunung Jati* Hospital. The sampling technique used was total sampling.

RESULT AND DISCUSSION

The authors conducted a univariate analysis to describe the frequency distribution of each variable, including age, sex, and histopathological type of nasopharyngeal carcinoma. This method helps to summarize the data and provide an overall picture of the characteristics of the sample, such as the distribution of age ranges and the most common histopathological subtypes.

The main statistical technique used in this study is the Chi-square test, which is used to explore the relationship between independent variables (age and sex) and dependent variables (histopathological types of nasopharyngeal carcinoma). The Chi-square test is suitable for categorical data and makes it possible to determine whether there is a statistically significant relationship between these variables.

Respondent Characteristics

There were 51 patients diagnosed with nasopharyngeal carcinoma at Gunung Jati Hospital in 2022-2023 based on inclusion and exclusion criteria. The age range of nasopharyngeal carcinoma patients in this study was between 11 and 80 years. The highest number of cases was found in the age group of 51-60 years, which was as many as 13 patients (25%). There was a difference between male and female cases, with 37 male patients (73%) and 14 female patients (27%) in a 2:1 ratio. The average incidence occurred in the highest age group, which was 51-60 years.

Table 1. Characteristics of patients with nasopharyngeal carcinoma.

Notes	Total (percentage)
Year	
2022	19 (37%)
2023	32 (63%)
Age	
0-10	0%
11-12	4 (8%)
21-30	3 (6%)
31-40	7 (14%)
41-50	12 (24%)
51-60	13 (25%)
61-70	7 (14%)
71-80	5 (10%)
Gender	
Man	37 (73%)
Woman	14 (27%)
Type of Histopathological	

Keratinizing Squamous Cell Carcinoma (SCC)	0%
Non-Keratinizing Squamous Cell Carcinoma	51 (100%)
Basaloid SCC	0%

Bivariate analysis

The most commonly found histopathological type is non-keratinized squamous cell carcinoma, which represents 100% (51 patients) of all cases. Of these, most were categorized as undifferentiated non-keratinized squamous cell carcinoma, which was present in 48 out of 51 patients, while the other 3 patients had differentiated non-keratinized squamous cell carcinoma. Non-keratinized subtypes that are not differentiated are more common, ranging from 75% to 100% in all age groups compared to other histopathological types. The Chi-Square test is used to assess the relationship between age, sex, and histopathological type of nasopharyngeal carcinoma. Based on Table 2, there were no variables that showed a significant relationship with histopathological type (p>0.05).

Table 2. Chi-square assay for correlation between age and histopathological subtypes of non-keratinized squamous cell carcinoma.

Variable	Histopathological						P value
	Undifferentiated non-keratinizing subtype		*Differentiated non-keratinizing subtype*		Total		
	N	%	N	%	N	%	
Age							
0-10	0	0,00%	0	0,00%	0	0,00%	
11-20	4	8,33%	0	0,00%	4	7.84%	
21-30	3	6,25%	0	0,00%	4	5,88%	
31-40	6	12,50%	1	33,33%	7	13,37%	
41-50	12	25,00%	0	0.00%	12	23,53%	0,471
51-60	13	27,08%	0	0.00%	13	25,49%	
61-70	6	12,50%	1	33,33%	7	13,73%	
71-80	4	8,33%	1	33,33%	5	9,80%	
Gender							
Man	35	72,92%	2	66,67%	37	72,55%	0,814
Woman	13	27,08%	1	33,33%	14	27%	

Discussion

The results of this study showed that of the 51 patients with nasopharyngeal carcinoma, the majority were in the age group of 51-60 years, with 13 people (25%) in that age range. The findings of this study are in line with the research of Melvern et al. (2022) at Dr. Kariadi Hospital Semarang in 2022 with the highest incidence found in the age group of 54-59 years, which was 33 out of 201 patients. Based on the relationship between age and the histopathological picture of nasopharyngeal carcinoma with the chi-square test, a p-value of 0.471 (P>0.05) was obtained, which means that there was no significant relationship between age and histopathological picture. Although age primarily affects a person's risk of developing malignancy, various studies have shown that aging is linked to impaired communication between stem cells as a result of aging, this disorder can lead to tissue or organ failure and the

development of cancer cells, along with an increase in the number of cell mutations (Yousefi et al., 2018). Based on this, age with histopathological type, Age is solely related to risk factors that can increase the likelihood of nasopharyngeal carcinoma occurring (Zhang et al., 2025).

The results showed that the majority of nasopharyngeal carcinoma patients were male, namely 37 people (73%) out of 51 patients (Guo et al., 2024b; Liu et al., 2022; Shi et al., 2025). The findings of this study are in line with research conducted by Susetiyo et al. (2022) et al at Dr. Soetomo Hospital Surabaya in 2022, most of the patients were male, namely 140 people out of 192 patients. The results of the analysis using the chi-square test showed a p-value of 0.814 ($p>0.05$), which showed no significant relationship between sex and the type of histopathological picture of nasopharyngeal carcinoma (Guo et al., 2024a; Lee et al., 2023; Zhai et al., 2023). The sex difference in the survival of nasopharyngeal carcinoma patients is caused by a combination of several factors, including the stage of the disease at diagnosis, biological differences between the two sexes, and hormonal influences (Kuswandi et al., 2020). Although lifestyle and delayed diagnosis play a role, biological characteristics and response to treatment may be more important (Zhang et al., 2023; Chang, 2021). The situation of nasopharyngeal carcinoma in men is higher due to lifestyle exposure such as smoking or alcohol consumption, but there is no association with the histopathological type of nasopharyngeal carcinoma (Pan et al., 2020). Males and females have the same likelihood of developing each type of histopathology (Pan et al., 2020).

The results of this study show that non-keratinized squamous cell carcinoma is the most common histopathological picture in nasopharyngeal carcinoma patients as many as 51 patients out of 51 patient data with the most subtypes being undifferentiated non-keratinized subtypes. The findings of this study are in line with the research of Bryan Melven et al. (2020) at Dr. Kariadi Hospital Semarang, where the most common type of histopathology of nasopharyngeal carcinoma is undifferentiated non-keratinized squamous cell carcinoma, observed in 182 out of 201 patient data. Non-keratinized cell carcinoma, especially undifferentiated subtypes, is widely found in Southeast Asia and has different characteristics compared to other types. These differences are not only histologically but also pathogenetically and epidemiologically (Kuswandi et al., 2020). Pathogenically, this undifferentiated subtype is strongly influenced by environmental and lifestyle factors. A common location for this cancer is the Rosenmüller fossa, an area in the nasopharynx. This suggests that the carcinogen can enter the respiratory tract, both from polluted air and from volatile compounds in food (Pan et al., 2020).

Risk factors that can affect the incidence of nasopharyngeal carcinoma include age, gender, and histopathological type of carcinoma from previous studies can influence the incidence of nasopharyngeal carcinoma, especially such as exposure from the patient's environment and smoking history (Yousefi et al., 2018). This suggests that there may be a relationship between age and sex with the type of histopathological picture of nasopharyngeal carcinoma. The results of this study show that there is no significant relationship, so the hypothesis in this study cannot be proven. Previous research also showed no significant association in this study. There has been no further research on the relationship between age and sex to the histopathology of nasopharyngeal carcinoma, so further research is needed to

obtain results where there is an age and sex relationship with the type of histopathology that can be used for better treatment in nasopharyngeal carcinoma patients.

CONCLUSION

The findings of this study show that there is no significant relationship, so the hypothesis in this study cannot be proven. Previous research also showed no significant association in this context. There has been no further research on the relationship between age and sex and the histopathology of nasopharyngeal carcinoma, so further research is needed to obtain results that demonstrate an age and sex relationship with the type of histopathology. This could be used to improve treatment for *nasopharyngeal carcinoma* patients.

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