



## HISTOPATHOLOGICAL STUDY OF SINONASAL AND NASOPHARYNGEAL LESIONS IN SUMBER WARAS HOSPITAL JAKARTA FROM 2017-2023

Yunita Dewi<sup>1</sup> Sony Sugiharto<sup>2\*</sup>

<sup>1</sup>Faculty of Medicine, Universitas Tarumanagara, Jakarta, Indonesia

<sup>2</sup>Department of Anatomical Pathology, Faculty of Medicine, Universitas Tarumanagara, Jakarta, Indonesia

\* Corresponding Author: E-mail: [marias@fk.untar.ac.id](mailto:marias@fk.untar.ac.id)

### ABSTRACT

**Background:** Various non-neoplastic and neoplastic lesions arise from the sinonasal tract and nasopharynx. Polyps are the most frequently reported sinonasal lesions, with a prevalence of 2%. Nasopharyngeal carcinoma is a common malignancy in Indonesia, with 19,943 new cases. Histopathological examination is the gold standard for diagnosis because management and prognosis vary among different lesions. **Objective:** The aim is to determine the incidence of various non-neoplastic and neoplastic lesions and to study the histopathological features with regard to age and gender. **Methods:** This study was a descriptive observational study with a cross-sectional design. The sample was retrieved from the histopathological records in Sumber Waras Hospital Jakarta from February 2017 to December 2023. The inclusion criteria were all patients with sinonasal or nasopharyngeal lesions that have been biopsied and then done histopathological examination at Sumber Waras Hospital Jakarta. The exclusion criteria were incomplete data and patients with histopathological diagnoses of necrotic tissue and inflammation. The sample consisted of 73 patients with a total of 76 cases, as 3 patients had multiple diagnoses. The data collected were later analyzed with SPSS software. **Results:** Among 73 patients, 54 were males and 19 were females. A maximum number of cases were diagnosed in the age group of 51-60. Among 43 sinonasal lesions, 25 (58,2%) were non-neoplastic and 18 (42%) were neoplastic lesions. Inflammatory polyps (42%) were the most common among the sinonasal lesions. Of 33 nasopharyngeal lesions, there were 2 (6,1%) non-neoplastic and 31 (93,9%) neoplastic lesions. The majority of these were of nasopharyngeal carcinoma (84,8%). **Conclusion:** Histopathological examination is essential for diagnosing and classifying sinonasal and nasopharyngeal lesions.

**Keywords:** histopathological examination, nasopharynx, non-neoplastic, neoplastic, sinonasal

### INTRODUCTION

The sinonasal tract, which includes the nasal cavity and paranasal sinuses, differs anatomically and embryologically from the nasopharynx<sup>1</sup>. The upper respiratory system is subject to numerous foreign particles, such as allergens, infections, chemical and physical irritants, and other environmental factors<sup>2,3</sup>. As a result of this multifactorial exposure, various clinical conditions arise in the sinonasal (SN) and nasopharyngeal (NAP) areas. These conditions include neoplastic lesions (benign and malignant) and non-neoplastic lesions (polyps, inflammatory conditions, and infection)<sup>1-3</sup>.

Polyps account for most non-neoplastic lesions in the sinonasal tract, occurring in 1-4% of cases<sup>3,4</sup>. The male-to-female ratio of polyps is approximately 2:1, and the prevalence rate is approximately 2%<sup>4,5</sup>. Meanwhile, sinonasal malignancies are a diverse collection of tumors, with a prevalence of 0,83 per 100.000 people. Sinonasal malignancies make up less than 1 in every 20 head and neck malignancies<sup>6</sup>.

Nasopharyngeal carcinoma (NPC) is a malignancy of the nasopharyngeal epithelium<sup>7</sup>. It is a

distinct neoplasm with a geographically specific distribution; this malignancy is rare in most of the globe but endemic in select places, particularly Southeast Asia. Nasopharyngeal carcinoma is also linked with Epstein-Barr virus (EBV) infection<sup>7,8</sup>. According to GLOBOCAN 2020, the global incidence and death rates for nasopharyngeal cancer are 133.354 and 80.008, respectively<sup>9</sup>.

Nasopharyngeal carcinoma is a malignancy often found in Indonesia and is the most common in the head and neck area<sup>8</sup>. According to GLOBOCAN 2020, it ranks fifth in Indonesia with 19,943 new cases, and men are more likely to develop the disease<sup>10</sup>.

An initial diagnosis can be made based on clinical symptoms and radiological findings. However, histopathological examination (HPE) is the gold standard for diagnosing and classifying lesions in the sinonasal (SN) and nasopharyngeal (NAP) regions, which are crucial for choosing the right course of treatment<sup>2,11</sup>. Research regarding histopathological features of lesions in the sinonasal and nasopharyngeal regions is still limited in Indonesia. Therefore, the present study was undertaken to determine the



Yunita Dewi, Sony Sugiharto

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incidence and frequency of various non-neoplastic and neoplastic lesions, study the histopathological features of sinonasal and nasopharyngeal lesions with regard to age and sex distribution, and compare the results with the available data.

### METHODS

This was a descriptive observational research with a cross-sectional design carried out between February 2017 and December 2023 in the Laboratory of Anatomic Pathology of Sumber Waras Hospital Jakarta. The data that will be used is secondary data obtained from the anatomical pathology form sheet, which meets the inclusion and exclusion criteria. This study's inclusion criteria were all patients with sinonasal or nasopharyngeal lesions (polyps and tumors) that have been biopsied and then done histopathological examination at Sumber Waras Hospital Jakarta. The exclusion criteria for this study were incomplete data on the anatomical pathology form sheets, patients with histopathological diagnoses of necrotic tissue, and inflammation (rhinitis, sinusitis, and nasopharyngitis). Samples were selected using a non-random consecutive sampling method. All research was conducted after obtaining an Ethics Letter issued by the Ethics Committee of the Faculty of Medicine, Universitas Tarumanagara, and Sumber Waras Hospital Jakarta. The research data obtained will be processed using Excel and analyzed using SPSS. Categorical univariate data, which includes frequency and proportion values (%), will be presented in the form of tables or figures. If the data is normally distributed, numerical univariate data analysis will present the average value and standard deviation. The data will present the median value and interquartile range if it is not normally distributed.

### RESULTS

The number of samples obtained in this study was 73 patients. However, 3 patients had more than one diagnosis making a total of 76 cases.

#### Sample Characteristics

The sample characteristics in this study were translated into sex and age groups. The majority of

the sample was male, 54 people (74%), with a male-to-female ratio of 2.8:1. Meanwhile, the age of the research sample ranged from 12 to 82 years, with a mean age of  $47.1 \pm 17.3$  years. The maximum number of cases was reported in the age group of 51-60 years, with 23 cases (31.5%), while minimum cases were reported in the age group of > 80 years, with 1 case (1.4%). This can be seen in Table 1.

Table 1. Sample Characteristics

Characteristics	Frequency (n)	Percentage (%)
<b>Sex</b>		
Male	54	74%
Female	19	26%
<b>Age Group (Years)</b>		
11-20	8	11%
21-30	6	8,2%
31-40	7	9,6%
41-50	15	20,5%
51-60	23	31,5%
61-70	9	12,3%
71-80	4	5,5%
>80	1	1,4%

#### Histopathological Diagnosis of Sinonasal and Nasopharyngeal Lesions

Out of 76 cases, 43 were sinonasal lesions, with 25 (58,2%) non-neoplastic lesions and 18 (42%) neoplastic lesions. Of the 18 neoplastic lesions, 12 (28%) were benign, and 6 (14%) were malignant. In the sinonasal region, 12 types of histopathological diagnoses were found, namely allergic polyps, inflammatory polyps, polyps with seromucinous gland hyperplasia, polyps with stromal atypia, inverted papilloma, squamous papilloma, Respiratory Epithelial Adenomatoid Hamartoma (REAH), hemangioma, neurofibroma, squamous cell carcinoma, sinonasal carcinoma undifferentiated, and malignant melanoma. From the non-neoplastic aspect, inflammatory polyps were the most common type of histopathological diagnosis of sinonasal lesions, amounting to 18 cases (41,9%). In contrast, from the neoplastic aspect, hemangioma was the most common type of histopathological diagnosis of benign neoplasm, numbering 6 cases (14%), and squamous cell carcinoma was the most common histopathological diagnosis of malignant neoplasm, numbering 3 cases (7%). This can be seen in Table 2.



Yunita Dewi, Sony Sugiharto

**Table 2.** Histopathological Diagnosis of Sinonasal Lesions

Histopathology Diagnosis	Frequency (n)	Percentage (%)
<b>Non-Neoplastic</b>		
Allergic polyp	4	9,3%
Inflammatory polyp	18	41,9%
Polyp with hyperplasia of seromucinous glands	1	2,3%
Polyp with stromal atypia	2	4,7%
<b>Neoplastic</b>		
Inverted papilloma	2	4,7%
Squamous papilloma	2	4,7%
Respiratory Epithelial Adenomatoid Hamartoma	1	2,3%
Hemangioma	6	14%
Neurofibroma	1	2,3%
Squamous cell carcinoma	3	7%
Sinonasal undifferentiated carcinoma	1	2,3%
Malignant melanoma	2	4,7%
<b>Total</b>	<b>43</b>	<b>100%</b>

\* Each patient may have more than one diagnosis

Out of 76 cases, 33 were nasopharyngeal lesions, with 2 (6,1%) non-neoplastic lesions and 31 (93,9%) neoplastic lesions. Of the 31 neoplastic lesions, 1 (3%) was benign, and 30 (90,9%) were malignant. In the nasopharyngeal region, 4 types of histopathological diagnoses were found, namely adenoid hypertrophy, angiofibroma, nasopharyngeal carcinoma, and lymphoma. From the non-neoplastic aspect, only adenoid hypertrophy with 2 cases (6.1%). In contrast, from the neoplastic aspect, angiofibroma was the only benign neoplasm with 1 case (3%), and nasopharyngeal carcinoma was the most common histopathological diagnosis malignant neoplasm numbering 28 cases (84.8%). This can be seen in Table 3.

**Table 3.** Histopathological Diagnosis of Nasopharyngeal Lesions

Histopathological Diagnosis	Frequency (n)	Percentage (%)
<b>Non-Neoplastic</b>		
Adenoid hypertrophy	2	6,1%
<b>Neoplastic</b>		
Angiofibroma	1	3%
Nasopharyngeal carcinoma	28	84,8%
Lymphoma	2	6,1%
<b>Total</b>	<b>33</b>	<b>100%</b>

\* Each patient may have more than one diagnosis

### Distribution of Histopathological Diagnosis of Sinonasal and Nasopharyngeal Lesions Based on Sex

This study found that histopathological diagnosis of sinonasal and nasopharyngeal lesions tended to be more dominant in men. In this study, sinonasal lesions that are of male predominance were sinonasal polyps such as allergic polyps, inflammatory polyps, polyps with seromucinous gland hyperplasia, and polyps with stromal atypia in the non-neoplastic aspect. In contrast, there was inverted papilloma, Respiratory Epithelial Adenomatoid Hamartoma (REAH), hemangioma, neurofibroma, and squamous cell carcinoma in the neoplastic aspect. Nonetheless, no particular non-neoplastic sinonasal lesions have a female predominance. On the other hand, neoplastic sinonasal lesions such as malignant melanoma and sinonasal undifferentiated carcinoma were of female predominance. Squamous papilloma was the only sinonasal lesion with a fair distribution between both sexes.

In the nasopharyngeal region, adenoid hypertrophy, the only non-neoplastic lesion, showed a fair distribution between both sexes. In contrast, all nasopharyngeal neoplastic lesions, such as angiofibroma, nasopharyngeal carcinoma, and lymphoma, showed a male predominance. This can be seen in Table 4.



Yunita Dewi, Sony Sugiharto

**Table 4.** Distribution of Histopathological Diagnosis of Sinonasal and Nasopharyngeal Lesions Based on Sex

Histopathological Diagnosis	Sex		Total n (%)
	Male n (%)	Female n (%)	
<b>Sinonasal Lesions</b>			
Allergic polyp	4 (100)	0	4 (100)
Inflammatory polyp	13 (72,2)	5 (27,8)	18 (100)
Polyp with hyperplasia of seromucinous glands	1 (100)	0	1 (100)
Polyp with stromal atypia	2 (100)	0	2 (100)
Inverted papilloma	2 (100)	0	2 (100)
Squamous papilloma	1 (50)	1 (50)	2 (100)
Respiratory Epithelial Adenomatoid Hamartoma	1 (100)	0	1 (100)
Hemangioma	4 (66,7)	2 (33,3)	6 (100)
Neurofibroma	1 (100)	0	1 (100)
Squamous cell carcinoma	3 (100)	0	3 (100)
Sinonasal undifferentiated carcinoma	0	1 (100)	1 (100)
Malignant melanoma	0	2 (100)	2 (100)
<b>Nasopharyngeal Lesions</b>			
Adenoid hypertrophy	1 (50)	1 (50)	2 (100)
Angiofibroma	1 (100)	0	1 (100)
Nasopharyngeal carcinoma	20 (71,4)	8 (28,6)	28 (100)
Lymphoma	2 (100)	0	2 (100)

\* Each patient may have more than one diagnosis

### Distribution of Histopathological Diagnosis of Sinonasal and Nasopharyngeal Lesions Based on Age Group

This study shows that sinonasal non-neoplastic lesions, the most allergic polyps, were found in the 41–50-year age group, with 2 cases (50%); the most inflammatory polyps were found in the 51-60-year age group, with 6 cases (33.3%); and both polyps with hyperplasia of seromucinous gland and polyps with stromal atypia were most commonly found in the 11–20-year age group, with 1 case (100%) and 2 cases (100%), respectively.

From the benign neoplastic aspect, inverted papillomas were found most often in the 61-70 and 71-80-year age groups, each with 1 case (50%). Squamous papillomas are found most often in the 21-30- and 51-60-year age groups, with as many as 1 case each (50%). Hemangiomas were found most frequently in the 51–60-year age groups, with as many as 3 cases (50%). Respiratory Epithelial Adenomatoid Hamartoma (REAH) and neurofibroma are found most frequently in the 51-60-year age groups, each with 1 case (100%).

From the aspect of malignant neoplasms, squamous cell carcinoma was primarily found in 3 age groups: 41-50, 61-70, and 71-80 years, with 1 case each (33.3%). Undifferentiated sinonasal carcinoma

was found most frequently in the 61–70-year age group, with 1 case (100%). Malignant melanoma is most commonly found in the age groups of 51-60 and 61-70 years, with 1 case each (50%).

In the nasopharyngeal non-neoplastic aspect, adenoid hypertrophy is most commonly found in the 21-30- and 41-50-year age groups, with 1 case each (50%). Angiofibroma is most commonly found in the 21-30-year age group, with 1 case (100%). Nasopharyngeal carcinoma is found in almost all age groups except for those aged 11-20 and >80 years. The highest prevalence of nasopharyngeal carcinoma was found in the 41-50 and 51-60-year age groups, both with 9 cases (32.1%). Lymphoma is also found most often in the 41-50 and 51-60-year age groups, with 1 case each (50%). This can be seen in Table 5.



Yunita Dewi, Sony Sugiharto

**Table 5.** Distribution of Histopathological Diagnosis of Sinonasal and Nasopharyngeal Lesions Based on Age Group

Histopathological Diagnosis	Age Group (Years)								Total n (%)
	11-20 n (%)	21-30 n (%)	31-40 n (%)	41-50 n (%)	51-60 n (%)	61-70 n (%)	71-80 n (%)	>80 n (%)	
<b>Sinonasal Lesions</b>									
Allergic polyp	0	0	0	2 (50)	1 (25)	1 (25)	0	0	4 (100)
Inflammatory polyp	5 (27,8)	2 (11,1)	2 (11,1)	2 (11,1)	6 (33,3)	1 (5,6)	0	0	18 (100)
Polyp with hyperplasia of seromucinous glands	1 (100)	0	0	0	0	0	0	0	1 (100)
Polyp with stromal atypia	2 (100)	0	0	0	0	0	0	0	2 (100)
Inverted papilloma	0	0	0	0	0	1 (50)	1 (50)	0	2 (100)
Squamous papilloma	0	1 (50)	0	0	1 (50)	0	0	0	2 (100)
Respiratory Epithelial Adenomatoid Hamartoma	0	0	0	0	1 (100)	0	0	0	1 (100)
Hemangioma	0	0	1 (16,7)	1 (16,7)	3 (50)	0	0	1 (16,7)	6 (100)
Neurofibroma	0	0	0	0	1 (100)	0	0	0	1 (100)
Squamous cell carcinoma	0	0	0	1 (33,3)	0	1 (33,3)	1 (33,3)	0	3 (100)
Sinonasal undifferentiated carcinoma	0	0	0	0	0	1 (100)	0	0	1 (100)
Malignant melanoma	0	0	0	0	1 (50)	1 (50)	0	0	2 (100)
<b>Nasopharyngeal Lesions</b>									
Adenoid hypertrophy	0	1 (50)	0	1 (50)	0	0	0	0	2 (100)
Angiofibroma	0	1 (100)	0	0	0	0	0	0	1 (100)
Nasopharyngeal carcinoma	0	1 (3,6)	4 (14,3)	9 (32,1)	9 (32,1)	3 (10,7)	2 (7,1)	0	28 (100)
Lymphoma	0	0	0	1 (50)	1 (50)	0	0	0	2 (100)
<b>Total</b>	8 (10,5)	6 (7,9)	7 (9,2)	17 (22,4)	24 (31,6)	9 (11,8)	4 (5,3)	1 (1,3)	76 (100)

\* Each patient may have more than one diagnosis

## DISCUSSION

The present study showed that most patients with sinonasal and nasopharyngeal lesions were male, with 54 cases (74%), while only 19 were female (26%). This study shows a male-to-female ratio of 2.8: 1. The results of this study are in accordance with research conducted by Surange *et al.* (2021), involving 127 patients also showed that the prevalence of males was higher, with 85 cases (66.9%) compared to females at 42 cases (33%), with a male to female ratio of 2.02 : 1<sup>4</sup>. Likewise with a study conducted by Garg *et al.* (2014) involving 147 patients also found that the prevalence of males was higher with a male to female ratio of 1.98: 1<sup>12</sup>.

This study showed that the age of patients ranged from 12-82 years, with the maximum cases reported in the age group of 51-60 years with 23 cases (31.5%), followed by 41-50 years at 15 cases (20.5%). The

results of this study are relevant based on research conducted by Patel *et al.* (2023) involving 42 patients, which also found that patients in the 51-60 year age group had the highest prevalence of 21%<sup>13</sup>. However, the results of this study are the opposite based on the results of a previous study conducted by Surange *et al.* (2020) involving 127 patients where the age group 41-50 years had the highest prevalence of 28 people (22 %), then followed by the age group 51-60 years as many as 25 people (19.7%)<sup>4</sup>.

In the sinonasal region, inflammatory polyps were the most common non-neoplastic lesion, with 18 cases (41.9%), followed by allergic polyps with 4 cases (9.3%). The results of this study are relevant to a study conducted by Sarumathy *et al.* (2021), in which 73 patients with non-neoplastic lesions, inflammatory polyps were also the most common with 42 cases (57.5%), followed by allergic polyps



Yunita Dewi, Sony Sugiharto

with a total of 18 cases (24.7%)<sup>14</sup>. These findings are also relevant to the study conducted by Jaison *et al.* (2015), where out of 77 patients with non-neoplastic lesions, the most common was also inflammatory polyps, with 28 cases (26.9%), followed by allergic polyps with 22 cases (21.1%)<sup>3</sup>. However, the results of this study were the opposite of a study conducted by Chauhan *et al.* (2023) involving 315 patients with sinonasal polyps, of which allergic polyps were the most common, with 189 cases (60%), followed by inflammatory polyps with 66 cases (21%)<sup>15</sup>. Among the other non-neoplastic lesions included in this study were polyps with hyperplasia of seromucinous gland with 1 case (2.3%) and polyps with stromal atypia with 2 cases (4.7%) in which the results of this study differ from the research conducted by Chauhan *et al.*<sup>15</sup> (2023) who found more cases of polyp with hyperplasia of seromucinous gland than polyp with stromal atypia. In our study, sinonasal polyps consisting of allergic polyps, inflammatory polyps, polyps with hyperplasia of seromucinous gland, and polyps with stromal atypia all have a male predominance and have a mean age of 37.6 years. This study's results are consistent with those of Chauhan *et al.* (2023), who also found male predominance and a mean age of 36.5 years<sup>15</sup>.

In this study, hemangioma was the most common among benign neoplasms found in the sinonasal region, with 8 cases (14%), followed by inverted papilloma and squamous papilloma with 2 cases each (4.7%). The results of this study are relevant to the research conducted by Mohapatra *et al.* (2020), where out of 21 patients with benign neoplasm, hemangioma was also found in the highest number with 6 cases (28.57%), followed by inverted papilloma with 4 cases (19.04%) and squamous papilloma with 3 cases (14.28%)<sup>16</sup>. Likewise, according to a study conducted by Vare *et al.* (2018), hemangioma was the most common lesion out of 14 patients with benign neoplastic lesions, with 5 cases (35.71%)<sup>17</sup>. However, the results of this study differ from the results of several previous studies, such as those conducted by Bundela *et al.*<sup>18</sup> (2022), Regmi *et al.*<sup>11</sup> (2021), Guleria *et al.*<sup>19</sup> (2017), and Garg *et al.*<sup>12</sup> (2014), who found that inverted papilloma is the most common benign neoplastic lesion in the sinonasal region.

This study found inverted papillomas more frequently in males with 2 cases (100%), which is relevant to the results of previous studies conducted

by Korata *et al.*<sup>20</sup> (2023), Gedam *et al.*<sup>21</sup> (2022), Jagannadham *et al.*<sup>22</sup> (2021), Shetty *et al.*<sup>23</sup> (2020), Guleria *et al.*<sup>19</sup> (2017), Shirazi *et al.*<sup>24</sup> (2015), and Jaison *et al.*<sup>3</sup> (2015). In this study, squamous papilloma was evenly distributed between both sexes, with 1 case each (50%). However, this study's results differ from those of a previous study conducted by Shirazi *et al.* (2015), which found more prevalent in males with a male-to-female ratio of 3.6 : 1<sup>24</sup>. Hemangioma in the present study showed a male predominance with 4 cases (66.7%), which is relevant to the results of a previous study conducted by Shirazi *et al.*<sup>24</sup> (2015) and Vartak *et al.*<sup>25</sup> (2020). However, the results of this study differ from several other studies, such as those conducted by Gedam *et al.*<sup>21</sup> (2022), Narvey *et al.*<sup>26</sup> (2022), and Jagannadham *et al.*<sup>22</sup> (2021), who found an even distribution between the two sexes, and this is also different from research conducted by Kumari *et al.*<sup>27</sup> (2022) and Vare *et al.*<sup>17</sup> (2018), where they found hemangiomas to be more prevalent in females.

In this study, inverted papillomas were found most frequently in the age group 61-70 and 71-80 years, with 1 case each (50%) with a mean age of 72.5 years. This study's results are relevant to a study conducted by Vare *et al.* (2018), where cases of inverted papilloma were found in patients aged 66 and 71 years<sup>17</sup>. However, this study's results differ from those of a previous study conducted by Shetty *et al.*<sup>23</sup> (2020) and Shirazi *et al.*<sup>24</sup> (2015), as the mean age of patients with inverted papilloma was 54.6 years and 53 years, respectively. Squamous papillomas in this study were found in the age group of 21-30 and 51-60 years, with 1 case each (50%), and the average age was 42 years. The results of this study are similar to the study conducted by Shirazi *et al.* (2015), where the average age of patients with squamous papilloma was 41.7 years<sup>24</sup>. Hemangiomas in this study were found most frequently in the age group of 51-60 years, with 3 cases (50%), and the average age was 53.5 years. This study's results differ from those of a previous study conducted by Shirazi *et al.* (2015), where the average age of hemangioma patients was 31.8 years<sup>24</sup>. The results of this study are also different from the results of previous studies conducted by Kumari *et al.*<sup>27</sup> (2022), who found the most in the age group of 21-40 years, and by Vartak *et al.*<sup>25</sup> (2020), who found the peak age for hemangiomas between the second and fifth decades of life.



Yunita Dewi, Sony Sugiharto

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The present study also found another benign neoplastic lesion in the sinonasal region, such as 1 case (2.3%) of REAH. The results of this study are similar to research conducted by Patel *et al.* (2023), where they also found 1 case (5%) of REAH out of 20 patients with benign neoplastic lesions<sup>13</sup>. In this study, the 1 case (100%) of REAH was of male sex and in the age group of 51-60 years. The results of this study are relevant to the study conducted by Vartak *et al.* (2020), in which they also found REAH to be more prevalent in males. However, there is also a slight difference, as Vartak *et al.* (2020) found the peak age of REAH in the seventh decade of life, which differed from our study<sup>25</sup>. Another benign neoplastic lesion in this study was neurofibroma with 1 case (2.3%). The results of this study are relevant to the studies conducted by Narvey *et al.*<sup>26</sup> (2022), Ahmad *et al.*<sup>28</sup> (2017), Bhattacharya *et al.*<sup>1</sup> (2015), and Shirazi *et al.*<sup>24</sup> (2015), with each finding 1 case of neurofibroma. In this study, 1 case (100%) of neurofibromas was of male sex and in the age group of 51-60 years. The results of this study are similar to those of Shirazi *et al.*<sup>24</sup> (2015), who also found neurofibroma to be more prevalent in males, but they are different from those of Narvey *et al.*<sup>26</sup> (2022), who found the most neurofibromas in the age group of 41-50 years.

Among malignant neoplastic lesions in the sinonasal region, squamous cell carcinoma was found most frequently, with 3 cases (7%). The results of this study are similar to the study conducted by Sarumathy *et al.* (2021), where out of the 8 patients with malignant neoplastic lesions, squamous cell carcinoma was also the most common lesion with 4 cases (50%)<sup>14</sup>. Also similar to the results of a previous study conducted by Garg *et al.* (2014), of 13 patients with malignant neoplastic lesions, squamous cell carcinoma was also the most common lesion in 6 cases (46.15%)<sup>12</sup>. In this study, squamous cell carcinoma is more prevalent in males, with a total of 3 cases (100%). Our findings were in accordance with Korata *et al.*<sup>20</sup> (2023), Gedam *et al.*<sup>21</sup> (2022), Kumari *et al.*<sup>27</sup> (2022), Narvey *et al.*<sup>26</sup> (2022), and Vartak *et al.*<sup>25</sup> (2020). However, the results of this study were different from the studies conducted by Jagannadham *et al.*<sup>22</sup> (2021) and Shetty *et al.*<sup>23</sup> (2020) where their research found more squamous cell carcinoma in females and was also different from the research conducted by Guleria *et al.*<sup>19</sup> (2017) where there was an even distribution between both sexes. Also, in this

study, squamous cell carcinoma was found most frequently in the age groups 41-50, 61-70, and 71-80 years with 1 case each (33.3%). This study's results align with a study conducted by Kumari *et al.* (2022), which also had the most squamous cell carcinomas in those aged >60 years, followed by the age group 41-60 years<sup>27</sup>. Similar results are seen in the study conducted by Vartak *et al.* (2020), which found that the peak incidence of squamous cell carcinoma was between the fifth and seventh decades of life<sup>25</sup>.

The present study also found other malignant neoplastic lesions in the sinonasal region, such as 1 case (100%) of sinonasal undifferentiated carcinoma. The results of this study are relevant to the study conducted by Jagannadham *et al.* (2021), which also found 1 case (5.25%) of sinonasal undifferentiated carcinoma<sup>22</sup>. The results of this study are also similar to the results of several other studies, such as those conducted by Regmi *et al.*<sup>11</sup> (2021) with 5 cases (3.7%), Mohapatra *et al.*<sup>16</sup> (2020) with 4 cases (8.16%), and Bhattacharya *et al.*<sup>1</sup> (2015) with 3 cases (12.5%). In this study, one case (100%) of sinonasal undifferentiated carcinoma was of female sex. Similar observations were depicted in studies by Gedam *et al.*<sup>21</sup> (2022) and Shirazi *et al.*<sup>24</sup> (2015). However, this study's results differ from Kumari *et al.*<sup>27</sup> (2022) and Vartak *et al.*<sup>25</sup> (2020), where both studies found more sinonasal undifferentiated carcinoma in males. Sinonasal undifferentiated carcinoma was primarily found in the age group of 61-70. This aligns with the study conducted by Vartak *et al.* (2020), who found the age range from the fourth to seventh decades of life<sup>25</sup>. However, it differs from research conducted by Kumari *et al.* (2022) 61, which obtained the most in the age range 41-60<sup>27</sup>.

Another malignant neoplastic lesion found in this study was malignant melanoma, with 2 cases (4.7%). The results of this study are in line with several other studies, such as those conducted by Patel *et al.*<sup>13</sup> (2023), Regmi *et al.*<sup>11</sup> (2021), and Guleria *et al.*<sup>19</sup> (2017), all of which have 3 cases. Malignant melanoma was found more frequently in women in this study, with a total of 2 cases (100%). Similar results were seen in research conducted by Shetty *et al.*<sup>23</sup> (2020) and Shirazi *et al.*<sup>24</sup> (2015). In the present study, malignant melanoma was found mainly in the age groups 51-60 and 61-70, with 1 case each (50%). These findings are consistent with those of Kumari *et al.*<sup>27</sup> (2022), which found the highest number at ages



Yunita Dewi, Sony Sugiharto

> 60, and Shetty *et al.*<sup>23</sup> (2020), which found that the peak incidence of malignant melanoma was in the seventh decade of life.

In the nasopharyngeal region, adenoid hypertrophy was the only non-neoplastic lesion obtained in this study, with 2 cases (6.1%). Similar results were seen in a study by Ahmad *et al.* (2017), where out of 45 patients with non-neoplastic lesions in the sinonasal and nasopharyngeal regions, 2 cases (2.22%) of adenoid hypertrophy were present<sup>28</sup>. In this study, cases of adenoid hypertrophy were evenly distributed between both sexes. However, this study's results differ from the studies conducted by Korata *et al.*<sup>20</sup> (2023) and Jaison *et al.*<sup>3</sup> (2015), in which both studies found that adenoid hypertrophy is more prevalent in males. This study shows adenoid hypertrophy is mainly seen in the age group of 21-30 and 41-50 years, with 1 case (50%) each. This is not consistent with the studies conducted by Sarumathy *et al.*<sup>14</sup> (2021) and Garg *et al.*<sup>12</sup> (2014), where both studies found that the majority of cases of adenoid hypertrophy were in the age group <10 years.

In the present study, angiofibroma was the only benign neoplastic lesion in the nasopharyngeal region, with 1 case (3%). The results align with several other studies, such as those conducted by Jaison *et al.*<sup>3</sup> (2015), with 5 cases (4.81%), and Bhattacharya *et al.*<sup>1</sup> (2015), with 4 cases (23.5%). This study found more angiofibroma in males with 1 case (100%). Similar results were seen in studies conducted by Vartak *et al.*<sup>25</sup> (2020), Patel *et al.*<sup>29</sup> (2020), Guleria *et al.*<sup>19</sup> (2017), and Jaison *et al.*<sup>3</sup> (2015). In this study, angiofibroma was most commonly found in the age group of 21-30, with 1 case (100%). The results of this study align with those of Patel *et al.*<sup>29</sup> (2020), who found angiofibroma patients mainly aged 10-25, and Vartak *et al.*<sup>25</sup> (2020), who found the peak incidence was in the second and third decades of life.

Among malignant neoplastic lesions in the nasopharyngeal region, nasopharyngeal carcinoma was found most frequently, with 28 cases (84.8%). The results of this study are similar to the study conducted by Mohapatra *et al.* (2020), where out of 49 patients with malignant neoplastic lesions in the sinonasal and nasopharyngeal regions, nasopharyngeal carcinoma was also the most common lesion with 20 cases (40.81%)<sup>16</sup>. However, this study's results differ from several previous studies because the number of nasopharyngeal carcinomas in

our study was far greater than in most previous studies. These can be seen from the results of previous studies such as those conducted by Bundela *et al.*<sup>18</sup> (2022) with only 1 case (33.3%), Jagannadham *et al.*<sup>22</sup> (2021) with 3 cases (15.79%), Sarumathy *et al.*<sup>14</sup> (2021) with 4 cases (20%), and Guleria *et al.*<sup>19</sup> (2017) with 2 cases (10%). In this study, nasopharyngeal carcinoma was more prevalent in males, with 20 cases (71.4%). The results of this study are relevant to the studies conducted by Korata *et al.*<sup>20</sup> (2023), Jagannadham *et al.*<sup>22</sup> (2021), Vartak *et al.*<sup>25</sup> (2020), Guleria *et al.*<sup>19</sup> (2017), and Shirazi *et al.*<sup>24</sup> (2015). Also, in this study, nasopharyngeal carcinoma is found in almost all age groups except for those aged 11-20 and >80 years. The highest prevalence of nasopharyngeal carcinoma was found in the age groups of 41-50 and 51-60 years, with 9 cases each (32.1%). The mean age of nasopharyngeal carcinoma patients in this study was 50.5 years. The results of this study are relevant to the studies conducted by Shirazi *et al.*<sup>24</sup> (2015), which found that the mean age of nasopharyngeal carcinoma patients was 45.6 years, and that conducted by Vartak *et al.*<sup>25</sup> (2020), which found the incidence of nasopharyngeal carcinoma in the second to sixth decades of life.

In this study, other malignant neoplastic lesions found in the nasopharyngeal region were lymphoma, with 2 cases (6.1%). Similar results were seen in a study conducted by Bhattacharya *et al.* (2015), where out of 24 patients with malignant neoplastic lesions, there were 2 cases (8.3%) of non-Hodgkin's lymphoma<sup>1</sup>. Lymphoma was found more frequently in males in this study, with 2 cases (100%). These research results are relevant to previous studies by Kumari *et al.*<sup>27</sup> (2022) and Shirazi *et al.*<sup>24</sup> (2015). In the present study, lymphoma was found most often in the age group of 41-50 and 51-60 years, with 1 case each (50%), with an average age of 51.5 years. The results of this study differ from the study conducted by Guleria *et al.* (2017), which found lymphoma mainly in the third decade of life<sup>19</sup>.

The limitation of this research is that the number of samples did not meet the specified target. This is because not all patients with sinonasal and nasopharyngeal lesions undergo a histopathological examination. Therefore, prospective studies with a longer observation period are needed to obtain precise and reliable data regarding sinonasal and nasopharyngeal lesions.





Yunita Dewi, Sony Sugiharto

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### CONCLUSION

Histopathological examination is essential for diagnosing and classifying various non-neoplastic and neoplastic lesions in the sinonasal and nasopharyngeal region, which leads to early and appropriate treatment.

### ETHICAL APPROVAL

Ethical Clearance for this study was obtained with the approval and consideration of the Health Research Ethics Commission (KEPK), Faculty of Medicine, Universitas Tarumanagara, with ethical clearance No. 289/KEPK/FK UNTAR/XII/2023, also with the approval and consideration of the Health Research Ethics Commission (KEPK), Sumber Waras Hospital with clearance No. 06/RSSW/KoM.EP/EC/I/2024.

### CONFLICTS OF INTEREST

There is no conflict of interest in this study.

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### AUTHOR CONTRIBUTIONS

The following contributions by the authors: conceptualization, SS and YD; methodology, SS and YD; software, YD; validation, SS; formal analysis, YD; investigation, YD; resources, YD; data curation, YD; writing—original draft preparation, YD; writing—review and editing, SS and YD; visualization, YD; supervision, SS; project administration, YD; funding acquisition, SS and YD.

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Yunita Dewi, Sony Sugiharto

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