

Analysis of the Association of Oncogenic Virus Infection with Lung Cancer Incidence in West Nusa Tenggara Province

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BACKGROUND AND OBJECTIVE

Lung cancer is the leading cause of cancer-related mortality worldwide, with high incidence and death rates.¹ Traditional risk factors include smoking, environmental exposure, and genetic predisposition.^{1,2} However, lung cancer is also frequently observed among non-smokers, suggesting the involvement of other contributing factors, including oncogenic viral infections.^{1,3} Several viruses such as Human Papillomavirus (HPV), Epstein-Barr Virus (EBV), and Cytomegalovirus (CMV) have been reported to play a role in lung carcinogenesis through mechanisms including chronic inflammation, immune modulation, and viral genome integration into host cells.⁴ This study aims to analyze the prevalence, viral types, and potential oncogenic mechanisms of HPV, EBV, and CMV in lung cancer patients in West Nusa Tenggara Province, Indonesia.

METHODS

This research will employ a cross-sectional design. The study subjects will consist of patients diagnosed with squamous cell lung cancer at the West Nusa Tenggara Provincial General Hospital between March and October 2025. Data will be collected from patient records, including demographic characteristics, smoking history, clinical staging, and treatment regimens. In addition, blood samples will be obtained to detect antibodies against EBV, HPV, and CMV. Descriptive statistical methods will be applied to analyze the data.

RESULTS

The required sample size for this study is 40 subjects. However, up to the current stage, only nine samples have been collected, and the study is still ongoing. A total of nine patients diagnosed with squamous cell lung cancer were included in the study. The majority of patients were male (78%), while females accounted for 22%. Most patients were younger than 60 years (67%), with the remaining 33% aged above 60 years. Based on body mass index (BMI), more than half of the patients were underweight (56%), 33% were overweight, and only 11% had a normal BMI.

Regarding smoking status, 67% of the patients were active smokers, while 33% were non-smokers. Among smokers, 56% had a smoking history of more than 20 pack-years, while 44% had less than 20 pack-years. In terms of clinical staging, all patients (100%) presented with advanced disease (>IIIA), and no cases were observed in stages below IIIA. The serological data (antibodies against CMV, HPV, and EBV) are still being processed.

These findings are consistent with global evidence showing that smoking is the dominant risk factor for squamous lung cancer, accounting for up to 80–90% of cases worldwide.¹ However, the presence of non-smokers in this cohort suggests that other contributors, including viral oncogenesis, may also play a role.^{1,3,4}

Table 1. Demographic characteristics

Characteristics		n	%
Gender	Man	7	78%
	Woman	2	22%
Age	< 60 <u>yo</u>	6	67%
	> 60 <u>yo</u>	3	33%
BMI	Normal	1	11%
	Underweight	5	56%
	Overweight	3	33%
Smoker	Yes	6	67%
	No	3	33%
Pack Years	> 20	5	56%
	< 20	4	44%
Staging	< IIIA	0	0
	> IIIA	9	100%

CONCLUSION

Lung cancer in West Nusa Tenggara Province predominantly affects older male patients with a smoking history and is most frequently diagnosed as advanced-stage squamous cell carcinoma. The ongoing serological analyses of EBV, HPV, and CMV are expected to provide a more comprehensive understanding of the potential contribution of oncogenic viral infections to pulmonary carcinogenesis.

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