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CYTOPATHOLOGICAL DIAGNOSIS OF RESPIRATORY DISEASES IN THE KASHMIR REGION

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ABSTRACT

The respiratory diseases are a significant source of morbidity and death across the world especially in areas that are not well-accessed by modern diagnostic services. Cytopathology of bronchoalveolar lavage (BAL) fluid is a non-invasive, fast, and low-cost technique of assessing respiratory pathology. This descriptive cross-section study was carried out during six months in the Department of Pathology, Sher-i-Kashmir Institute of Medical Sciences (SKIMS), Srinagar in the study to determine the diagnostic value of BAL cytology of patients who presented with suspected respiratory illness. One hundred and ten BAL samples were examined in the routine cytological methods, i.e. May-Grunwald-Giemsa and Papanicolaou staining. Of them, 55 cases (50.0%) were negative, 36 cases (32.7%) had benign or inflammatory alterations, 6 cases (5.5%) were suspicious of malignancy, and 13 cases (11.8%) were positive of malignant cytology and no cases of tuberculosis were reported. There was the dominance of males and the majority of patients were between the 41-60 years of age. Squamous cell carcinoma and small cell carcinoma were found to be the most common subtypes of malignant cases. The results suggest that BAL cytology is a worthwhile and useful diagnostic method in identifying inflammatory respiratory diseases, and malignant respiratory diseases especially in a resource constrained area like the Kashmir region.

Keywords: *Bronchoalveolar lavage, Cytopathology, Respiratory diseases, Lung malignancy, Kashmir region.*

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1. INTRODUCTION

Respiratory diseases are a significant problem of the global public health and one of the main causes of morbidity and mortality globally. The diseases include a broad range of infectious, inflammatory and neoplastic diseases such as tuberculosis, pneumonia, chronic obstructive respiratory disease (COPD), interstitial lung diseases, and lung cancer. The disease burden of respiratory diseases is found to be greater in the developing and resource constrained areas whereby delayed diagnosis, inaccessibility of specialized tests and lack of proper health care facilities play an essential role in the poor clinical outcomes.

The Kashmir region has a distinct epidemiological situation in relation to respiratory diseases. Combined with its cold climate, long winters, extensive heating and cooking with biomass fuels, extensive tobacco smoking (including hookah), and work-related exposure to dust and pollution, all put the population at risk of respiratory morbidity. Also, the geographical factors and the lack of access to modern diagnostic centers contribute to the further complexity of detecting and treating respiratory issues in the region as soon as possible. This has created an urgent requirement of diagnostic modalities which are effective but at the same time cheap, less invasive and can be readily incorporated in the day-to-day clinical practice.

Cytopathology is a crucial component in diagnostic assessment of the respiratory diseases, as it enables microscopic analysis of exfoliated or aspirated respiratory cells included in a respiratory sample like sputum, bronchoalveolar lavage (BAL), pleural fluid, and bronchial brushings. Cytological modalities are low-invasiveness, cost-efficient and can give quick diagnostic data and thus are especially useful in low-resource conditions. One of these, bronchoalveolar lavage, has become an extremely useful diagnostic procedure to assess the pathology of the lower respiratory tract as it allows sampling of the distal airways and alveolar spaces which are otherwise inaccessible.

BAL cytology specifically comes in handy in the diagnosis of inflammatory and infectious pulmonary diseases, the identification and initial characterization of lung malignancies. It enables the detection of cellular variations that are indicative of malignancy, infection or inflammation and early diagnosis which is of great importance in enhancing patient prognosis. Cytology is also useful in distinguishing between infectious conditions and neoplastic

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processes in the tuberculosis-endemic areas, and thus helps to choose the right treatment plan and minimize the spread of the disease.

1.1 Background of the Study

Different etiologies, overlapping clinical manifestations, and varying radiological appearance are some of the reasons why respiratory diseases remain a serious challenge to diagnosis. Proper and timely diagnosis is important to achieve successful management, especially in diseases like lung malignancies and chronic inflammatory lung diseases, which are characterized by poor prognosis and higher mortality rates on the case of late diagnosis. The traditional diagnostic approaches, such as imaging and sputum analysis, can also give insufficient or inconclusive data and particularly in a problem related to a lower respiratory tract.

The bronchoalveolar lavage (BAL) has become a key diagnostic test that offers the opportunity to sample directly the cells of the distal airways and alveolar spaces. Cytopathology of BAL fluid gives useful data about the morphology of the cells, inflammatory course, presence of infectious agents and malignant alterations. The procedure is relatively safe, minimally invasive and can be conducted in the course of regular bronchoscopy, so it can be used on patients who fail to qualify to undergo more invasive methods like lung biopsy.

Respiratory diseases are widespread in clinical practice in areas such as Kashmir where there is an environmental exposure to biomass smoke, tobacco use, occupational dust as well as some cold climatic conditions. Nevertheless, the facilities of more advanced diagnostics like histopathology, immunohistochemistry, and molecular testing are still unavailable in many healthcare institutions. In this case, BAL cytology is an effective diagnostic method that can help clinicians identify and diagnose a disease at its early stages and make a decision.

Although BAL has a high level of use in tertiary care hospitals, few data in the region that can assess its diagnostic value and cytopathologic range among Kashmiri citizens exist. Gaining insight into the trends in cytological results on BAL samples would be critical in achieving better patient management by enhancing the accuracy of diagnoses. Thus, the current test was aimed to check the cytopathological results of BAL samples in patients with suspected

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respiratory illness and to determine the value of the BAL cytology as the first-line test tool in the Kashmir area.

2. LITERATURE REVIEW

Bhat et al. (2022) carried out an audit-based research in Kashmir area to determine the diagnostic value of bronchoalveolar lavage in respiratory diseases. Their research was a systematic evaluation of BAL in patients who presented with the persistent respiratory symptoms and inconclusive radiological findings. According to the authors, BAL had a significant impact in improving the diagnostic accuracy by allowing identification of inflammatory, infectious, and malignant diseases that could not have been detected using regular investigations. The article has emphasized the use of BAL as a least invasive and most informative diagnostic tool, especially useful in an area such as Kashmir whereby the environment, smoking patterns, and climatic factors are known to cause a high number of respiratory diseases. The results were quite encouraging in the sense that incorporation of BAL in the routine diagnostic procedures in the tertiary care centers should be integrated to improve early and accurate diagnosis.

Qadri et al. (2016) conducted a cytological study on cervical lymphadenopathy on a tertiary care institution located in the Kashmir Valley to determine the efficiency of cytology in distinguishing different pathological conditions. In spite of the fact that the target of the study was lymph node cytology but not respiratory specimen, it showed the high diagnostic validity of cytopathology methods in the characterization of benign, inflammatory, and malignant lesions. According to the authors, cytology was found to be the fastest, precise, and low-cost method of diagnostic data, especially in low-resource facilities. Their results supported the generalizability of cytology as a critical diagnostic modality, which admittedly justified its applicability in respiratory cytology, which also included BAL analysis.

Maddox (2021) summarized the place of cytopathology in the diagnosis, treatment and management of malignant respiratory diseases with lung cancer as the main focus. The review talked about the changing role of cytology methods including the BAL, bronchial washings and brushings in identifying and subtyping lung cancers. Maddox indicated that cytopathology was often used as the initial diagnostic element making it possible to identify malignancy at an

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early stage and use it as a guide in clinical judgments. The research also observed that cytological diagnosis tended to diminish the necessity of conducting invasive biopsy procedures particularly with patients who were old or medically incapable of undergoing surgery and thus enhancing patient safety and patient managerial results.

Baldassarri et al. (2019) discussed the diagnosis of lower respiratory tract infectious disease using cytopathology as a cytopathologist. Their research reiterated that BAL cytology was more effective in detecting bacterial, fungal, and opportunistic infections in immunocompromised persons. The authors have shown that cytological analysis of BAL samples was able to quickly give an initial diagnosis, providing the opportunity to start relevant treatment on time. They came to the conclusion that BAL cytology added to the use of microbiological and molecular studies to obtain an instant morphological evidence of the infection and increase the overall effectiveness of diagnostic in lower respiratory tract infections.

Erozan and Ramzy (2014) detailed and authoritative description of the cytomorphology of pulmonary cytopathology, outlining the cytomorphological appearances of a broad variety of inflammatory, infectious and neoplastic lung illnesses. Their work was used as a reference on how respiratory cytology specimens such as BAL fluid could be interpreted. The authors noted that it is crucial to be able to identify small cytological details and correlate the results with clinical and radiological data to enhance the accuracy of diagnosis. They made their contribution to the development of the area of pulmonary cytology and the development of standard approaches to interpretations that still are used in the sphere of cytopathology.

Layfield et al. (2016) formulated standardized terminology and nomenclature of respiratory cytology according to the rules of the Papanicolaou Society of Cytopathology. They did this to resolve discrepancies in the reporting of respiratory cytology results as well as enhance the communication between cytopathologists and clinicians. The authors suggested a standardized reporting model that can be applied to respiratory samples, including BAL, that helped achieve a higher level of diagnostic clarity, reproduction, and enhanced clinical decision-making. The research highlighted the fact that standardized reporting systems provided more confidence to diagnostic reports and improved patient management, especially in situations that had suspicious or malignant cytological outcomes.

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3. RESEARCH METHODOLOGY

The research methodology gives a systematic approach that has been chosen in the current study to assess the cytopathological observations in bronchoalveolar lavage (BAL) samples of suspected respiratory disease patients. It outlines the research design, sample size, inclusion and exclusion criteria, and data analysis procedures used in making sure that results obtained are reliable and valid. The methodology was structured and descriptive to evaluate the diagnostic value of BAL cytology in the study population to determine the presence of inflammatory, infectious, and malignant respiratory conditions.

3.1 Research Design

The current research used descriptive cross-sectional inquiry design in an attempt to gauge the cytopathological results in the bronchoalveolar lavage (BAL) sample collected in patients with suspected respiratory infections. The research involved six months period, that is, between February 2025 to August 2025, in the Department of Pathology, Sher-i-Kashmir Institute of Medical Sciences (SKIMS), Srinagar.

The design was chosen because it gives an opportunity to observe and analyse cytological features at one moment in time without any intervention. The cross-sectional design was appropriate in determining whether BAL cytology could be used in the diagnosis of inflammatory, infectious, and malignant respiratory diseases in the study population.

3.2 Sample Size

The patients that were included in the study were patients that came to the clinic with the clinical and radiological suspicion of respiratory disease and had their bronchoscopy conducted as a part of the diagnostic work-up. The study comprised 110 bronchoalveolar lavage (BAL) samples. Analysis of other respiratory samples, like pleural fluid, sputum, and bronchial brushing, were not included in the process of analysis.

3.3 Inclusion and Exclusion Criteria

The study was inclusive of all the age groups and both sexes of patients who provided sufficient BAL samples. Inadequate, contaminated, and poorly preserved samples were not included.

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Patients that underwent recent respiratory surgical operations or interventions that may influence cytological interpretations were also left out.

3.4 Data Analysis

Analysis of cytological findings was done and classified under the following diagnostic groups:

- Negative for malignancy
- Benign / inflammatory
- Suspicious for malignancy
- Malignant
- Infectious (such as tuberculosis)

The findings were tabulated and interpreted in a descriptive manner in order to determine the diagnostic value of BAL cytology in respiratory disorders.

4. RESULTS

The findings of the current research are given to demonstrate the demographic profile of patients and cytopathological findings of bronchoalveolar lavage (BAL) of suspected respiratory illness patients. This part includes an in-depth discussion of the study population in relation to its age and gender ratio, and then the range of cytological diagnosis on BAL examination. The results are arranged in subsections in order to explain general cytology, diagnostic group, and relative distribution of malignant and non-malignant lesions with the help of relevant tables and graphs.

4.1 Demographic Profile of the Study Population

Table 1 indicates the demographic data of the study population, indicating how the patients were distributed based on the gender and the age group out of the 110 bronchoalveolar lavage (BAL) samples that were examined.

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Table 1: Demographic Profile of Study Population (Age and Gender Distribution)

Demographic Variable	Category	Frequency (n)	Percentage (%)
Gender	**Male**	67	60.9
	Female	43	39.1
	Total	110	100
Age Group (Years)	**0–20**	5	4.5
	21–40	27	24.5
	41–60	48	43.6
	>60	30	27.4
	Total	**110**	**100**

There were 110 patients, 67 of them (60.9% males and 43 (39.1% females) which means that there was a preponderance of males in the study population. The age-wise analysis showed that most of the patients (48 cases; 43.6%), were between the age of 41 years and 60 years, then the patients with the age above 60 years (30 cases; 27.4%). The age group (21-40 years) had 27 cases (24.5 percentage), the age group (0-20 years) had the least with 5 cases (4.5 percentage).

This distribution would imply that the prevalence of respiratory diseases that needed BAL assessment was greater in individuals of middle age and old age.

The way the demographic profile of the study population is represented is shown in the graph in Fig. 1 and that is the percentage distribution of the population according to age groups and gender.

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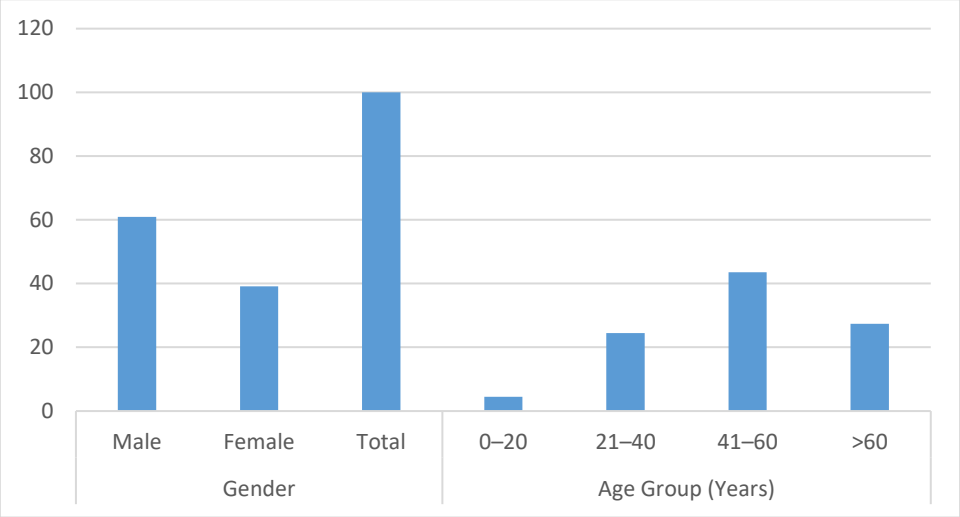

Figure 1: Graphical Representation of the Percentage of Demographic Profile of Study Population (Age and Gender Distribution)

The figure 1 illustration shows a clear indication of the proportion of patients being more male as opposed to female. It also points out that the age group of 41-60 years is the greatest population of the study sample, then the above 60 years patients. This tendency substantiates the fact that.

4.2 Cytological Findings in BAL

Table 2 indicates the distribution of cytological results noted in the bronchoalveolar lavage (BAL) samples studied in the paper.

Table 2: Cytological Findings in BAL

Cytological Diagnosis	Frequency (n)	Percentage (%)
Negative for malignancy	55	50.0
Benign / Inflammatory	36	32.7
Suspicious for malignancy	6	5.5
Malignant	13	11.8
Tuberculosis	0	0.0
Total	**110**	**100**

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Of the 110 samples of BAL, 55 (50.0 percent) were malignancy negative. The second most common group was benign and inflammatory lesions that appeared in 36 cases (32.7%). Malignant suspicious cytology was seen in 6 cases (5.5%), and 13 cases (11.8%), confirmed malignancy on cytology. In the present study, BAL samples showed no incidences of tuberculosis.

The results of these studies show that most BAL samples were non-malignant even though a very high percentage of samples led to the identification of malignant lesions, demonstrating the diagnostic value of BAL cytology.

Figure 2 illustrates the distribution of cytological results of bronchoalveolar lavage in percentages.

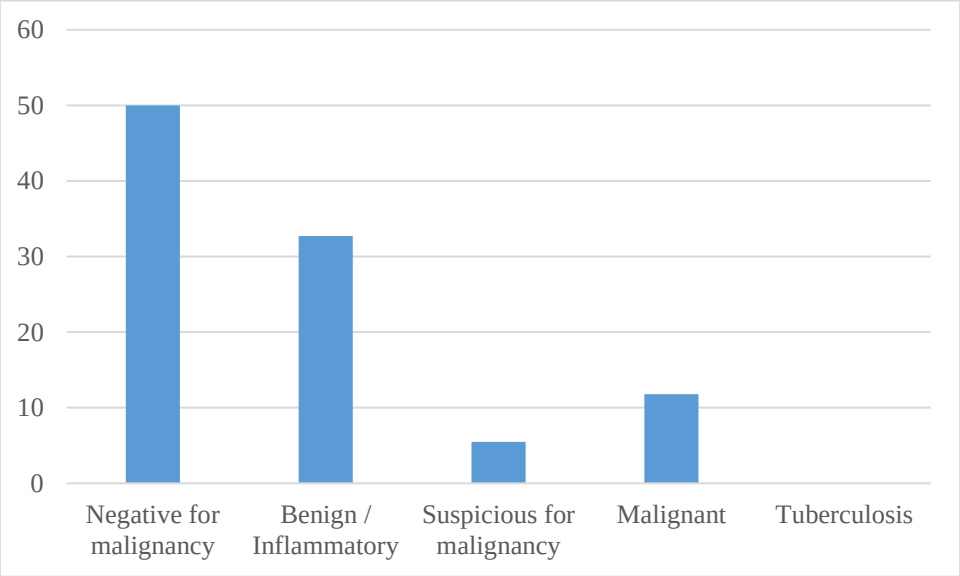

Figure 2: Graphical Representation of the Percentage of Cytological Findings in BAL Samples (n = 110)

The Figure 2 illustration is that negative and benign/inflammatory results represent the greatest proportion of BAL specimens. There was also a significant percentage of samples with malignant cytology, and this points to the importance of BAL as a diagnostic measure in the identification of respiratory malignancies.

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4.3 Distribution of Cytological Diagnosis in BAL Samples

Table 3 shows the different cytological diagnosis that were made on samples of bronchoalveolar lavage (BAL) samples that were examined in the study.

Table 3: Cytological Diagnosis in BAL

Diagnosis	**Frequency (n)**	**Percentage (%)**
Negative	55	50.0
Benign / Inflammatory	36	32.7
Suspicious for malignancy	6	5.5
Malignant	13	11.8
Total	**110**	**100**

Among the 110 BAL samples, 55 (50.0% or 55 cases) were said to be negative and this means no significant cytological alteration. The second largest diagnostic group consisted of benign and inflammatory diagnosis with 36 cases (32.7%). Malignancy suspicious cytological appearances had been identified in 6 cases (5.5%), and 13 cases (11.83) confirmed to be malignant.

This distribution has indicated that even though the majority of the BAL samples were normal, a significant percentage participated in the diagnosis of malignant respiratory diseases.

The cytological diagnoses distribution of bronchoalveolar lavage samples is given in Figure 3 as percentages.

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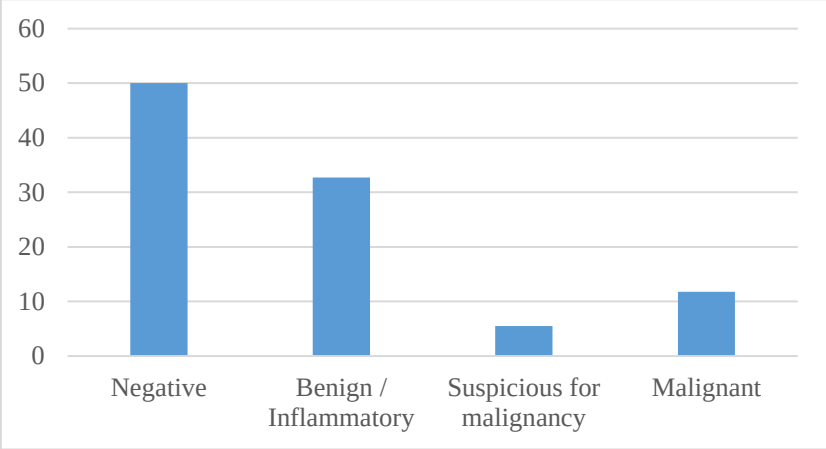

Figure 3: Graphical Representation of the Percentage of Cytological Diagnosis in BAL

The negative and benign/inflammatory diagnoses are significantly prevalent in BAL samples and it is evident in the figure 3 representation. The availability of the cases of malignancy and suspicious cases also demonstrates the diagnostic value of BAL cytology in the assessment of respiratory disorders.

4.4 Malignant versus Non-Malignant Cytology in BAL

Table 4 is a comparative distribution of malignant, suspicious and non-malignant cytological findings, which were observed in bronchoalveolar lavage (BAL) samples, which were involved in the study.

Table 4: Malignant vs Non-Malignant Cytology in BAL Samples (n = 110)

Cytological Category	**Frequency (n)**	**Percentage (%)**
Non-malignant (Negative + Benign/Inflammatory)	91	82.7
Suspicious for malignancy	6	5.5
Malignant	13	11.8
Total	**110**	**100**

Among 110 BAL samples, 91 cases (82.73%) included non-malignant ones (including negative and benign/inflammatory) samples. The suspicion of malignancy was found in 6 cases (5.5%), and 13 cases (11.8%), confirmed to be malignant, were detected on cytopathological analysis.

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Those findings show that most of the BAL samples were not malignant; nonetheless, it is also determined that a significant number of the samples exhibited malignant cytology, which supports the significance of BAL analysis in the early diagnosis of respiratory malignancies.

Figure 4 shows the distribution of percent of malignant, suspicious, and non-malignant cytological results in BAL samples.

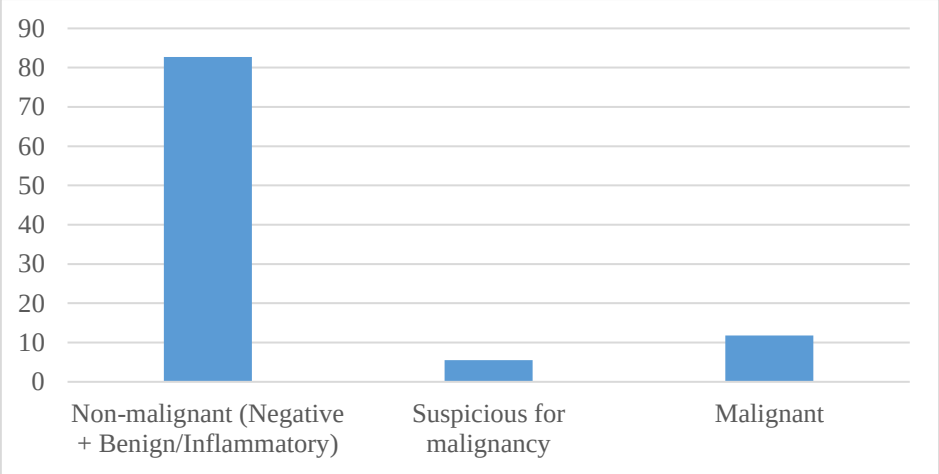

Figure 4: Graphical Representation of the Percentage of Malignant vs Non-Malignant Cytology in BAL Samples (n = 110)

The 4-figure illustration makes it very clear that most cases are non-malignant in terms of the BAL samples. Simultaneously, the occurrence of the malignant and suspicious cases also puts into the perspective of the diagnostic relevance of BAL cytology when assessing patients with possible respiratory diseases.

5. DISCUSSION

The current research was done to determine the diagnostic value of bronchoalveolar lavage (BAL) cytology among suspected patients with respiratory diseases in the Kashmir province. Cytopathology should not be discarded because of its low-invasiveness, short-turn time, and cost-efficiency especially in environments that have a limited number of resources.

A male dominance was found in the current research as a higher percentage of males was found in the study population. The observation is in line with other past studies and can be explained by the fact that male individuals are more exposed to the established risk factors including

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smoking, dusts at workplace, and environmental pollutants. Most patients were between the 41 years and 60 years bracket then those above 60 years meaning that Respiratory illnesses that would need BAL assessment are more prevalent among middle-aged and older people.

Cytological findings were analyzed to indicate that half of BAL samples turned out negative, and the remainder 32.7% of samples possessed changes of benign or inflammatory origin, which indicates a high rate of the non-malignant respiratory pathology within the study population. These results can be compared to the previous studies that emphasize the utility of BAL cytology in the diagnosis of inflammatory and infectious pulmonary pathologies.

Critically, 13 BAL samples (11.8%) were found to contain malignant cells, which highlights the immense importance of BAL cytology in the diagnosis of malignancies in the lungs. Also, 5.5 percent of the cases were suspicious of malignancy and it is important to note that close clinical and radiological correlation and where required, further diagnostic assessment is required. It is likely that either the lack of tuberculosis diagnosis in BAL samples in this research can be attributed to successful screening, previous treatment, or the large proportion of non-infectious etiologies in the chosen group of patients.

6. CONCLUSION

The current research has indicated the significance of bronchoalveolar lavage (BAL) cytology in the diagnostic assessment of respiratory conditions. Examination of 110 BAL samples demonstrated that the majority were non-malignant with a significant number containing benign or inflammatory changes, which indicated the high morbidity of non-neoplastic respiratory disease. It is important to note that cases with malignant lesions were observed in 11.8% of cases, indicating that BAL cytology was effective in determining malignancy in the lungs, and suspicious cases used the close clinicoradiological correlation and follow-up. Male dominance and prevalence of disease in middle aged and older people was noted probably by exposure to higher levels of environmental and occupational risk. On the whole, the research confirms that BAL cytology is a stable, minimally invasive, and affordable as a first-line diagnostic modality to respiratory diseases in environments with limited access to invasive biopsies and more sophisticated molecular diagnostics, and its routine application can make an excellent contribution to the early diagnosis of the disease and patient management.

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REFERENCES

1. Bhat, J. I., Tramboo, Z. M., Shah, T. H., Charoo, B. A., & Qazi, I. A. (2022). Enhancing respiratory disease diagnosis by bronchoalveolar lavage in Kashmir: an audit of findings. *Archives of Disease in Childhood*, *107*(12), 1079-1082.
2. Qadri, S. K., Hamdani, N. H., Besina, S., Makhdoomi, R., & Rasool, R. (2016). Cytological Study of Cervical Lymphadenopathy in a Trtiary Care Institution from Kashmir Valley, India. *J Cytol Histol*, *7*(418), 41-50.
3. Maddox, A. (2021). Cytopathology in the diagnosis, treatment and management of malignant respiratory disease. *Diagnostic Histopathology*, *27*(11), 447-458.
4. Baldassarri, R. J., Kumar, D., Baldassarri, S., & Cai, G. (2019). Diagnosis of infectious diseases in the lower respiratory tract: a cytopathologist's perspective. *Archives of Pathology & Laboratory Medicine*, *143*(6), 683-694.
5. Erozan, Y. S., & Ramzy, I. (2014). *Pulmonary cytopathology* (Vol. 6). New York: Springer.
6. Layfield, L. J., Baloch, Z., Elsheikh, T., Litzky, L., Rektman, N., Travis, W. D., ... & Geisinger, K. (2016). Standardized terminology and nomenclature for respiratory cytology: The P apanicolaou Society of Cytopathology guidelines. *Diagnostic cytopathology*, *44*(5), 399-409.
7. Khari, P., Srivastava, S., & Mullick, S. (2020). The Papanicolaou Society of cytopathology classification for pulmonary specimens: application in exfoliative respiratory cytology. *Ann Pathol Lab Med*, *7*(9), A434-438.
8. Layfield, L. J., Roy-Chowdhuri, S., Baloch, Z., Ehya, H., Geisinger, K., Hsiao, S. J., ... & VanderLaan, P. A. (2016). Utilization of ancillary studies in the cytologic diagnosis of respiratory lesions: the papanicolaou society of cytopathology consensus recommendations for respiratory cytology. *Diagnostic cytopathology*, *44*(12), 1000-1009.
9. Canberk, S., Field, A., Bubendorf, L., Chandra, A., Cree, I. A., Engels, M., ... & Schmitt, F. C. (2023). A brief review of the WHO reporting system for lung cytopathology. *Journal of the American Society of Cytopathology*, *12*(4), 251-257.
10. Canberk, S., Montezuma, D., Aydın, O., Demirhas, M. P., Denizci, B., Akbas, M., ... & Schmitt, F. (2018). The new guidelines of Papanicolaou Society of Cytopathology for

ISSN: 2321-3914
Volume: 4 Issue: 3
December 2025
Impact Factor: 10.1
Subject: Pathology

respiratory specimens: assessment of risk of malignancy and diagnostic yield in different cytological modalities. *Diagnostic cytopathology*, *46*(9), 725-729.

11. Allison, D. B., Simner, P. J., & Ali, S. Z. (2018). Identification of infectious organisms in cytopathology: a review of ancillary diagnostic techniques. *Cancer cytopathology*, *126*, 643-653.
12. Ilie, M., Hofman, V., Long-Mira, E., Selva, E., Vignaud, J. M., Padovani, B., ... & Hofman, P. (2014). "Sentinel" circulating tumor cells allow early diagnosis of lung cancer in patients with chronic obstructive pulmonary disease. *PloS one*, *9*(10), e111597.
13. Orard, M., Depecker, M., Hue, E., Pitel, P. H., Couroucé-Malblanc, A., & Richard, E. A. (2016). Influence of bronchoalveolar lavage volume on cytological profiles and subsequent diagnosis of inflammatory airway disease in horses. *The Veterinary Journal*, *207*, 193-195.
14. Depecker, M., Richard, E. A., Pitel, P. H., Fortier, G., Leleu, C., & Couroucé-Malblanc, A. (2014). Bronchoalveolar lavage fluid in Standardbred racehorses: influence of unilateral/bilateral profiles and cut-off values on lower airway disease diagnosis. *The Veterinary Journal*, *199*(1), 150-156.
15. Chrabańska, M., Środa, M., Kiczmer, P., & Drozdzowska, B. (2020). Lung cancer cytology: Can any of the cytological methods replace histopathology?. *Journal of cytology*, *37*(3), 117-121.
16. Azoulay, E., Russell, L., Van de Louw, A., Metaxa, V., Bauer, P., Povoa, P., ... & Nine-i Investigators. (2020). Diagnosis of severe respiratory infections in immunocompromised patients. *Intensive care medicine*, *46*(2), 298.
17. Dauvillier, J., Ter Woort, F., & van Erck-Westergren, E. (2019). Fungi in respiratory samples of horses with inflammatory airway disease. *Journal of veterinary internal medicine*, *33*(2), 968-975.
18. Davidson, K. R., Ha, D. M., Schwarz, M. I., & Chan, E. D. (2020). Bronchoalveolar lavage as a diagnostic procedure: a review of known cellular and molecular findings in various lung diseases. *Journal of thoracic disease*, *12*(9), 4991.
19. Harris, E. J., Musk, A., de Klerk, N., Reid, A., Franklin, P., & Brims, F. J. (2019). Diagnosis of asbestos-related lung diseases. *Expert review of respiratory medicine*, *13*(3), 241-249.
20. Akbarovna, N. A. (2023). Current views on the Mechanisms of Development of Bronchial Asthma and Chronic Obstructive Pulmonary Disease. *Central Asian Journal of Medical and Natural Science*, *4*(5), 440-444.

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