Epidemiological Trends and Diagnostic Patterns Among Clinical Laboratories in Pangasinan

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DOI: https://dx.doi.org/10.51244/IJRSI.2025.1215PH000182

Received: 12 October 2024; Accepted: 20 October 2024; Published: 14 November 2025

ABSTRACT

This quantitative descriptive correlational research determined the epidemiological trends and diagnostic patterns of diseases diagnosed through clinical laboratory testing in the clinical laboratories in Pangasinan over a three-year period from 2021 to 2023.

RESULTS

show a predominance of middle-aged individuals, a slight female majority, higher income bracket, and a trend toward urbanization among the respondents. A significant burden of chronic diseases, particularly Type 2 Diabetes and respiratory conditions, emphasizing the urgent need for targeted public health interventions and ongoing health management strategies. The diagnostic patterns indicate a strong emphasis on essential tests for overall health evaluation, particularly in monitoring diabetes and respiratory conditions, highlighting their prevalence and the need for targeted medical attention. Significant relationship between demographic factors and both the epidemiological trends and diagnostic patterns, indicating that older, higher-income females in urban areas are particularly susceptible to various diseases and more likely to undergo comprehensive laboratory testing. A positive correlation between epidemiological trends of various diseases and corresponding diagnostic patterns, indicating that higher prevalence and incidence rates are associated with increased utilization of specific clinical laboratory tests.

It is suggested that the "Action Plan - Enhancing Public Health Outcomes through Improved Epidemiological Surveillance" be utilized to focus on the prevention and management of chronic diseases such as Type 2 Diabetes and respiratory conditions. Laboratory management should enhance protocols to ensure timely and efficient testing for high-prevalence conditions, alongside training staff on the significance of comprehensive testing for at-risk populations. The Department of Health is encouraged to implement community health programs that raise awareness and provide resources for early detection and management of chronic diseases, particularly targeting older, higher-income females. Lastly, future researchers should investigate the impacts of socioeconomic factors on health outcomes and evaluate the effectiveness of targeted interventions in reducing disease prevalence among vulnerable populations.

INTRODUCTION

Clinical laboratories play a vital role in the healthcare system by conducting diagnostic tests on clinical specimens to support disease prevention, diagnosis, monitoring, and treatment. These laboratories utilize various diagnostic tools, including molecular diagnostics, microbiological cultures, biochemical assays, and histopathological techniques, to detect both infectious and non-communicable diseases. Globally and locally, epidemiological trends observed in clinical laboratories help in identifying disease patterns, monitoring outbreaks, and shaping healthcare policies. With technological advancements, these laboratories now contribute significantly to real-time disease surveillance, antimicrobial resistance monitoring, and the implementation of evidence-based treatment protocols.

In the Philippines, including the province of Pangasinan, both public and private clinical laboratories face the dual burden of infectious diseases such as tuberculosis and dengue, and a growing prevalence of chronic

ISSN No. 2321-2705 | DOI: 10.51244/IJRSI | Volume XII Issue XV October 2025 | Special Issue on Public Health

illnesses like cardiovascular diseases, diabetes, and cancer. The country's healthcare system, a mix of public and private sectors, is working towards expanding diagnostic capacity and improving the accuracy and accessibility of laboratory services. In Pangasinan—one of the largest provinces in Luzon with a diverse population and healthcare access levels—private laboratories serve as essential healthcare providers. They complement public health efforts by offering specialized and accessible diagnostic services that meet the varied needs of the community.

This study on "Epidemiological Trends and Diagnostic Patterns among Clinical Laboratories in Pangasinan" was conducted to better understand local disease prevalence and laboratory practices. By examining these patterns, Medical Technologists can ensure that diagnostic procedures are timely, relevant, and evidence-based, contributing to improved patient outcomes. Additionally, the study promotes continuous professional development, enhances collaboration among healthcare stakeholders, and supports public health efforts through accurate disease monitoring and early detection strategies. The insights gathered aim to strengthen laboratory services in Pangasinan, aligning them with national health priorities and the Sustainable Development Goals (SDGs), particularly in ensuring healthy lives and promoting well-being for all.

Statement of the Problem

This study primarily determined the epidemiological trends and diagnostic patterns of diseases diagnosed through clinical laboratory testing in the clinical laboratories in Pangasinan.

Specifically, it sought to answer the following sub-problems:

What is the demographic profile of the respondents in terms of:

1. Age;
2. Sex;
3. Economic Status; and
4. Geographic Location?

What are the epidemiological trends of diseases diagnosed through clinical laboratory testing along:

1. Disease;
2. Prevalence; and
3. Incidence?

What are the diagnostic patterns of diseases diagnosed through clinical laboratory testing along:

1. Laboratory tests; and
2. Microbiological cultures?

Is there a significant relationship between the demographic profile and epidemiological trends of diseases diagnosed through clinical laboratory testing?

1. Is there a significant relationship between the demographic profile and diagnostic patterns of diseases diagnosed through clinical laboratory testing?
2. Is there a significant relationship between the epidemiologic trends and diagnostic patterns diagnosed through clinical laboratory testing?
3. What Action Plan can be proposed to enhance the epidemiological and diagnostic capabilities of clinical laboratories?

RESULTS AND DISCUSSION

Demographic Profile of the Respondents

Based on age, sex, economic status, and geographic location. Further, it could be observed that according to age distribution, the largest age group is 51-60 years (73, 27%), followed closely by 41-50 years (65, 24%), indicating a significant proportion of middle-aged individuals. The younger age groups (21-30 and 31-40) account for a smaller share (33, 12% and 46, 17%, respectively), while 18% (48) are above 60 years. As regards sex, the population is slightly skewed towards females (142, 53%) compared to males (124, 47%), suggesting a balanced representation with a slight female majority. In terms of economic status, there is a substantial portion of the respondents that falls into the higher income bracket of more than Php 20,000 (121, 45%), while 34% (30) earn between Php 10,000-20,000, and 21% (55) are below Php10,000. This indicates a relatively positive economic status among the majority. Lastly, as to geographic location, the majority of respondents live in urban areas (152, 57%), compared to 43% (114) in rural locations, reflecting a trend of urbanization in the sample.

Epidemiological Trends of Diseases Diagnosed through Clinical laboratory Testing

Type 2 Diabetes is the most prevalent condition, accounting for 21% of the population (56 cases). This suggests a significant public health concern, indicating the need for targeted prevention and management strategies. Chronic Bronchitis (32, 12%) and bacterial pneumonia (32, 12%) also show substantial prevalence, highlighting respiratory conditions as critical health issues in this group. Coronary Artery Disease (CAD) (28, 11%) and Viral Pneumonia (28, 11%) follow closely, reflecting important cardiovascular and respiratory health challenges. Myocardial Infarction (26, 10%) and Emphysema (23, 9%) are also significant, suggesting ongoing health risks related to heart and lung conditions. Ischemic Stroke (12, 5%), Hemorrhagic Stroke (12, 5%), and Type 1 Diabetes (12,5%) are the least prevalent in this dataset. While these conditions are serious, their lower frequency may indicate either better management or less occurrence in this population. The data highlights a substantial burden of chronic diseases, particularly Type 2 Diabetes and respiratory illnesses. This underscores the importance of public health Moreover, the prevalence and incidence rates of various diseases per 1,000 population, reflecting key health concerns. Type 2 Diabetes has the highest prevalence at 6 cases per 1,000, indicating a critical health issue that may necessitate targeted public health interventions for prevention and management. Other conditions with significant prevalence include coronary artery disease (CAD), Myocardial Infarction, Bacterial Pneumonia, Viral Pneumonia, and Chronic Bronchitis, all at 3 cases per 1,000. This suggests these diseases are common and require ongoing health management strategies.

Also, all diseases except Type 2 Diabetes show an incidence rate of 1 new case per 1,000, indicating that new cases are emerging at a similar rate across these conditions. This suggests a stable burden of these diseases in the population. Type 2 Diabetes has a slightly higher incidence rate of 2, highlighting that new cases are developing more rapidly compared to other diseases, which may indicate an increasing trend in this condition.

Diagnostic Patterns of Diseases Diagnosed through Clinical Laboratory Testing

Complete Blood Count (CBC) is the most frequently performed test, with 145 instances (55%). This suggests it is a standard and essential test for evaluating overall health and detecting various conditions.
Lipid Profile follows closely with 96 instances (36%), indicating its importance in assessing cardiovascular risk factors. Blood Glucose and HbA1c tests, each at 68 instances (26%), reflect a strong focus on monitoring diabetes and metabolic health, which aligns with the prevalence of conditions like Type 2 Diabetes in the population. Other tests like C-reactive Protein (30, 11%), Troponin Levels (26, 10%), and Coagulation Profile (26, 10%) suggest monitoring for inflammation, cardiac events, and clotting issues, respectively.
Arterial Blood Gas tests, though less common at 23 instances (9%), indicate a need for assessing respiratory function in specific cases.

On the other hand, as to microbial cultures, sputum cultures are the most prevalent, with 55 instances (21%), likely reflecting a focus on respiratory infections, which are critical given the high prevalence of pneumonia and bronchitis in the population. Blood cultures (32, 12%) are also significant, essential for identifying

ISSN No. 2321-2705 | DOI: 10.51244/IJRSI | Volume XII Issue XV October 2025 | Special Issue on Public Health

systemic infections or sepsis. Viral cultures (28, 11%) indicate an awareness of viral infections, which may include respiratory viruses, aligning with the noted prevalence of viral pneumonia.

Relationship between the Demographic Profile and Epidemiological trends; and Diagnostic Patterns of Diseases diagnosed through Clinical Laboratory Testing Epidemiological Trends

Age, sex, economic status, and geographic location are positively correlated with the frequency, prevalence, and incidence rates of various diseases, as indicated by the Pearson r values. This correlation suggests that older adults, particularly females with an income exceeding Php 20,000, and those residing in urban areas are more likely to be affected by conditions such as coronary artery disease (CAD), Myocardial Infarction, Ischemic Stroke, Hemorrhagic Stroke, Bacterial Pneumonia, Viral Pneumonia, Chronic Bronchitis, Emphysema, Type 1 Diabetes, and Type 2 Diabetes.

Diagnostic Patterns diagnosed through Clinical Laboratory Testing

Demographic factors of age, sex, economic status, and geographic location are positively correlated with the patterns of diseases diagnosed through clinical laboratory testing. This suggests that older adults, especially females with an income exceeding Php 20,000, and those living in urban areas are more likely to undergo various laboratory tests, including Lipid Profile, C-Reactive Protein, Complete Blood Count, Troponin Levels, Blood Glucose, Coagulation Profile, Arterial Blood Gas, HbA1c, and cultures for sputum, blood, and viruses.

Relationship between the Epidemiologic Trends and Diagnostic Patterns diagnosed through Clinical Laboratory Testing

Epidemiologic trends concerning the frequency, prevalence, and incidence rates of diseases such as Coronary Artery Disease (CAD), Myocardial Infarction, Ischemic Stroke, Hemorrhagic Stroke, Bacterial Pneumonia, Viral Pneumonia, Chronic Bronchitis, Emphysema, Type 1 Diabetes, and Type 2 Diabetes are positively correlated with diagnostic patterns, including tests like Lipid Profile, C-Reactive Protein, Complete Blood Count, Troponin Levels, Blood Glucose, Coagulation Profile, Arterial Blood Gas, HbA1c, and cultures for sputum, blood, and viruses.

CONCLUSION

This study provides a comprehensive overview of the demographic profiles, epidemiological trends, and diagnostic patterns observed in clinical laboratories in Pangasinan. The findings reveal critical insights into the health challenges faced by the population and underscore the importance of targeted public health interventions.

1. A predominance of middle-aged individuals, a slight female majority, a higher income bracket, and a trend toward urbanization among the respondents.
2. A significant burden of chronic diseases, particularly Type 2 Diabetes and respiratory conditions, emphasizing the urgent need for targeted public health interventions and ongoing health management strategies.
3. The diagnostic patterns indicate a strong emphasis on essential tests for overall health evaluation, particularly in monitoring diabetes and respiratory conditions, highlighting their prevalence and the need for targeted medical attention.
4. Significant relationship between demographic factors and both the epidemiological trends and diagnostic patterns, indicating that older, higher-income females in urban areas are particularly susceptible to various diseases and more likely to undergo comprehensive laboratory testing.
5. A positive correlation between epidemiological trends of various diseases and corresponding diagnostic patterns, indicating that higher prevalence and incidence rates are associated with increased utilization of specific clinical laboratory tests.

RECOMMENDATIONS

Based on the findings of this study, several targeted recommendations are proposed to enhance public health outcomes and improve clinical practices. These suggestions aim to address the identified health issues and optimize the use of diagnostic resources in the region.

1. It is suggested that the "Action Plan - Enhancing Public Health Outcomes through Improved Epidemiological Surveillance" be utilized to focus on the prevention and management of chronic diseases such as Type 2 Diabetes and respiratory conditions.
2. Laboratory management should enhance protocols to ensure timely and efficient testing for high-prevalence conditions, alongside training staff on the significance of comprehensive testing for at-risk populations.
3. The Department of Health is encouraged to implement community health programs that raise awareness and provide resources for early detection and management of chronic diseases, particularly targeting older, higher-income females.
4. Lastly, future researchers should investigate the impacts of socioeconomic factors on health outcomes and evaluate the effectiveness of targeted interventions in reducing disease prevalence among vulnerable populations.

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