Scientific Journal for Publishing in Health Research and Technology

Volume 2, Issue 3, 2026, Pages: 207-213

Journal homepage: https://sjphrt.com.ly/index.php/sjphrt/en/index

Distribution of Prothrombin Time (PT) Results and Their Relationship to Sex Among Individuals in Maysan Governorate: A Cross-Sectional Study

Raghad Jabbar Abdul-Sahib [1]*, Azhar Mohammed Alewi [2] , Rehal Jehad Husain [3]
[1,2,3] Directorate of Education Maysan, Ministry of Education, Iraq

توزيع نتائج زمن البروثرومبين (*PT*) وعلاقتها بالجنس بين الأفراد في محافظة ميسان: دراسة مقطعية

رغد جبار عبد الصاحب*[1]، أزهار محمد عليوي [2]، رحال جهاد حسين [3]
[3،2،1] مديرية تربية محافظة ميسان، وزارة التربية، العراق

*Corresponding author: raghad.jabbar@ec.edu.iq

Received: June 03, 2026	Accepted: August 08, 2026	Published: September 02, 2026

Abstract:

Background: Prothrombin time (PT) is a fundamental laboratory test used to assess the efficiency of the extrinsic and intrinsic coagulation pathways. It has clinical importance in detecting coagulation disorders and monitoring certain medical conditions and anticoagulant treatments. Some coagulation parameters may vary among individuals depending on demographic and physiological factors. **Objective:** This study aimed to determine the distribution of PT results and investigate the differences between males and females among individuals in Maysan Governorate. **Materials and Methods:** A cross-sectional study was conducted based on PT test results available at the laboratory during the study period. The study included individuals for whom PT results were available and their sex was identified. Participants were divided into two groups according to sex: males and females. PT values were compared between the two groups using appropriate statistical tests. **Results:** 59 out of 316 results (18.7%) were classified as positive, compared to 257 negative results (81.3%). The percentage of positive results among males was 21.4% (18 out of 84), while it was 17.7% among females (41 out of 232). The comparison did not show a statistically significant relationship between sex and the classification of the test result ($\chi^2 = 0.573$, $P = 0.449$). The percentage of positive results over the five months ranged from 10.5% to 29.8%. **Conclusion:** The results of the study indicate the presence or absence of a difference in PT values between males and females within the studied population. These results provide preliminary data on the pattern of PT values in Maysan Governorate, with the need for future studies that include additional clinical and laboratory factors.

Keywords: Prothrombin time, PT, blood clotting, sex, male, female, Maysan, Iraq.

الملخص

الخلفية: يُعد زمن البروثرومبين (PT) اختبارًا معمليًا أساسيًا يُستخدم لتقييم كفاءة مسارات التخثر الخارجية والداخلية. وله أهمية سريرية في الكشف عن اضطرابات التخثر ومراقبة بعض الحالات الطبية وعلاجات مضادات التخثر. قد تختلف بعض معايير التخثر بين الأفراد تبعًا لعوامل ديموغرافية وفسيولوجية. **الهدف:** هدفت هذه الدراسة إلى تحديد توزيع نتائج زمن البروثرومبين (PT) ودراسة الاختلافات بين الذكور والإناث بين الأفراد في محافظة ميسان. **المواد وطرائق العمل:** أُجريت دراسة مقطعية استنادًا إلى نتائج اختبار زمن البروثرومبين (PT) المتوفرة في المختبر خلال فترة الدراسة. شملت الدراسة الأفراد الذين توفرت لديهم نتائج اختبار زمن البروثرومبين، وتم تحديد جنسهم. قُسّم المشاركون إلى مجموعتين حسب الجنس: ذكور وإناث. قُورنت قيم زمن البروثرومبين بين المجموعتين باستخدام الاختبارات الإحصائية المناسبة. **النتائج:** صُنّفت 59 نتيجة من أصل 316 (18.7%) على أنها إيجابية، مقارنةً بـ 257 نتيجة سلبية (81.3%). بلغت نسبة النتائج الإيجابية بين الذكور 21.4% (18 من أصل 84)، بينما بلغت 17.7% بين الإناث (41 من أصل 232). لم تُظهر المقارنة وجود علاقة ذات دلالة إحصائية بين الجنس وتصنيف نتيجة الاختبار ($\chi^2 = 0.573$ ، $P = 0.449$). تراوحت نسبة النتائج الإيجابية خلال الأشهر الخمسة بين 10.5% و29.8%. **الاستنتاج:** تشير نتائج الدراسة إلى وجود أو عدم وجود اختلاف في قيم زمن البروثرومبين بين الذكور والإناث ضمن العينة المدروسة. توفر هذه النتائج بيانات أولية حول نمط قيم زمن البروثرومبين في محافظة ميسان، مع الحاجة إلى دراسات مستقبلية تتضمن عوامل سريرية ومخبرية إضافية.

الكلمات المفتاحية: زمن البروثرومبين، PT، تخثر الدم، الجنس، ذكر، أنثى، ميسان، العراق.

Introduction

Blood clotting is a complex physiological process that maintains the integrity of blood vessels and prevents excessive blood loss in the event of injury. A group of clotting factors participate in this process, working in a coordinated sequence that culminates in the formation of a blood clot [1,2]. Prothrombin time (PT) is an important laboratory test for evaluating the clotting process, as it measures the time required for clot formation after the addition of specific reagents to plasma [3,4]. The test primarily reflects the efficiency of the extrinsic and common pathways of the coagulation system; therefore, any abnormality in its value may be related to changes in certain coagulation factors [5,6].The PT test is used in many clinical applications, most notably in evaluating bleeding disorders, assessing certain liver diseases and vitamin K deficiency, and monitoring patients receiving oral anticoagulants, specifically vitamin K antagonists [7,8].The PT result is usually expressed in seconds and can be converted to the International Normalized Ratio (INR), which allows for comparison of results between different laboratories using different systems and reagents [9].Although PT is primarily influenced by factors related to coagulation and health status, studying its distribution according to demographic variables may help describe the pattern of laboratory results in the local population [10,11].Maysan Governorate is one of the Iraqi regions that requires more local laboratory studies to provide data on routine test results. Therefore, this study was conducted to evaluate and compare PT values between males and females within the studied population.

Materials and Methods

Study Design

This study was conducted using a cross-sectional design based on laboratory tests performed on individuals during the study period.

Study population and sample
The study included 316 individuals who underwent PT testing. The gender and PT value were recorded for each participant. Participants were divided into two groups: 84 males and 232 females.

Data collection
Study data were obtained from laboratory test results records. The data used in the analysis included gender, the PT test result recorded at the laboratory, and the month in which the test was performed. Any variables not available in the database were not included.

PT testing
Prothrombin time (PT) testing was performed as part of routine laboratory procedures during the study period. Data were obtained from available laboratory records. This study did not include numerical values of PT in seconds or International Normalized Ratio (INR) measurements. The analysis was based on the classification of PT results as recorded in the laboratory database (positive or negative). In this study, the terms "positive" and "negative" refer to classifications documented in laboratory records and are not independently defined as diagnostic criteria for coagulation disorders or PT.

Statistical Analysis
The data were analyzed using descriptive statistics, including calculating frequencies and percentages. The chi-square (χ^2) test was used to assess the relationship between sex and PT result classification. A p-value < 0.05 was considered statistically significant. Comparative means tests and continuous value analysis were not used because numerical values for PT time in seconds and INR were not available in the database.

Ethical Considerations
This study was conducted in accordance with the ethical principles governing research involving human data. The study relied solely on laboratory records containing physical fitness test results and gender information. No personal information was collected, and participant privacy was maintained throughout the study. The data was used for scientific research purposes.

Results and discussion

Overall distribution of PT test results
The total number of tests included in the study was 316. The results showed that 59 tests were classified as positive (18.7%), while 257 results were classified as negative (81.3%).

Table 1. **Overall Distribution of PT Test Results**

PT result	Number	%
Positive	59	18.7%
Negative	257	81.3%
Total	316	100%

Distribution by sex
The 316 individuals were distributed as follows: 84 males (26.6%) and 232 females (73.4%). The number of positive results among males was 18 out of 84 (21.4%), while the number of positive results among females was 41 out of 232 (17.7%).

Table 2. Comparison of PT values between males and females

Gender	Total	Positive PT	Negative PT	Positive PT ratios
Male	84	18	66	21.4%
Female	232	41	191	17.7%
Total	316	59	257	18.7%

The chi-square test showed no statistically significant relationship between sex and PT result classification, with a χ^2 value of 0.573 and a p-value of 0.449.

Distribution over the five months

The number of tests was 42 in January month, 63 in February month, 86 in March month, 57 in April month, and 68 in May month.

Table 3. Distribution over the five months

Month	Total	Positive PT	Negative PT	Positive PT ratios
January	42	7	35	16.7%
February	63	14	49	22.2%
March	86	9	77	10.5%
April	57	17	40	29.8%
May	68	12	56	17.6%
Total	316	59	257	18.7%

The percentage of positive results ranged from 10.5% to 29.8%. This variation is a descriptive pattern within the study period and cannot be considered evidence of a seasonal effect or causal temporal variation due to the lack of clinical information and other factors that could explain the inter monthly differences.

Discussion

The results of the current study, which included 316 prothrombin time (PT) tests, showed no statistically significant relationship between sex and PT result classification. This finding suggests that sex was not a significant factor influencing the variation in PT classification among the participants in the current sample. This result is consistent with a recent Iraqi study conducted in Karbala, where PT values were similar between males (12.898 ± 1.906 seconds) and females (12.910 ± 1.207 seconds), with no statistically significant difference between them (P = 0.975) [9]. PT is a key test for assessing the extrinsic and intrinsic pathway of coagulation and is primarily affected by hepatocellular coagulation factors and vitamin K, in addition to the use of anticoagulants and certain medical conditions [12–14]. The lack of correlation between sex and PT in the current study may indicate that other biological factors may be more influential than sex alone in determining the test result. Furthermore, impaired liver function can lead to a prolonged PT due to decreased synthesis of several coagulation factors, which explains why PT requires knowledge of the examinee's health status [15–17].The effects of age and sex lead to heterogeneous results; A large study of over 116,000 adults showed that sex- and age-related differences in PT were limited, supporting the possibility of using a common male-female reference range in adults [18,19]. More recent data indicate that age, particularly after 50, and sex can contribute to increased variability in PT, suggesting that the influence of these factors may vary according to population, age group, method of analysis, and reagents used [20]. Studies also confirm that reference ranges for coagulation tests may vary according to age, population, and laboratory analysis system [21,22].Therefore, the lack of a significant relationship between sex and PT classification in the current study does not mean that sex has

no effect on PT at all, but rather that this effect was not statistically significant within the studied sample. The study's strengths include the large sample size (316 tests) and the availability of local data from Maysan Governorate. However, the lack of numerical values for PT, INR, age, medications, liver function, clinical status, and reasons for the test is an important limitation when interpreting the results. Therefore, future studies in Maysan Governorate are recommended, using numerical values for PT and INR, and recording clinical, demographic, and pharmacological variables, to more accurately identify the factors most associated with variations in coagulation test results.

Study Limitations

Several limitations must be considered when interpreting the results of this study. First, the study relied on laboratory records, and prothrombin time (PT) values in seconds and International Normalized Ratio (INR) values were unavailable. Therefore, the analysis was limited to classifying the PT results recorded in the laboratory database. Second, clinical and demographic variables such as age, comorbidities, liver function, and reasons for requesting PT testing were not available. Third, the study was conducted at a specific location in Maysan Governorate, which may limit the generalizability of the results to a wider population. Future studies using larger samples, numerical measurements of PT and INR, and clinical and demographic information are recommended to provide a more comprehensive understanding of the factors associated with variability in PT.

Conclusion

The study showed that 59 out of 316 PT tests were classified as positive in laboratory records, representing 18.7%, compared to 81.3% negative results. The percentage of positive results was higher in males (21.4%) than in females (17.7%), although the difference was not statistically significant ($\chi^2 = 0.573$, $P = 0.449$).The monthly distribution also showed variation in the percentage of positive results, ranging from 10.5% to 29.8%. This variation cannot be explained as seasonal or causal due to the limited clinical data available. In general, this study provides preliminary descriptive data on the pattern of PT results recorded in the studied sample in Maysan Governorate. However, generalizing the results or interpreting them as indicative of a prevalence of coagulation disorders requires future studies based on numerical PT and INR values and incorporating more comprehensive clinical and demographic variables.

Compliance with ethical standards

Disclosure of conflict of interest

The authors declare that they have no conflict of interest.

References

[1] WILHELM, Grzegorz, et al. The crossroads of the coagulation system and the immune system: interactions and connections. *International journal of molecular sciences*, 2023, 24.16: 12563. https://doi.org/10.3390/ijms241612563

[2] 2. VILAHUR, Gemma; FUSTER, Valentin. Interplay between platelets and coagulation: from protective haemostasis to pathological arterial thrombosis. *European heart journal*, 2025, 46.5: 413-423. https://doi.org/10.1093/eurheartj/ehae776

[3] 3.Yang R, Zubair M, Moosavi L. Prothrombin Time. [Updated 2024 Jan 23]. In: StatPearls [Internet]. Treasure Island (FL): StatPearls Publishing; 2026 Jan-. Available from: https://www.ncbi.nlm.nih.gov/books/NBK544269/

[4] 4.Mackie I, Casini A, Pieters M, Pruthi R, Reilly-Stitt C, Suzuki A. International council for standardisation in haematology recommendations on fibrinogen assays, thrombin clotting time and related tests in the investigation of bleeding disorders. Int J Lab Hematol. 2024; 46(1): 20-32. https://doi.org/:10.1111/ijlh.14201

[5] 5. MOUALLA, Hayan; GARCIA, David. Vitamin K antagonists–current concepts and challenges. *Thrombosis research*, 2011, 128.3: 210-215. https://doi.org/10.1016/j.thromres.2011.04.011

[6] 6.Dorgalaleh A, Favaloro EJ, Bahraini M, Rad F. Standardization of Prothrombin Time/International Normalized Ratio (PT/INR). Int. J. Lab Hematol. 2021; 43: 21–28. https://doi.org/10.1111/ijlh.13349

[7] 7.Dai, J., Mao, P., Pu, C. et al. Trimester-specific reference intervals and profile of coagulation parameters for Chinese pregnant women with diverse demographics and obstetric history: a cross-sectional study. BMC Pregnancy Childbirth 23, 421 (2023). https://doi.org/10.1186/s12884-023-05571-z

[8] 8AYNALEM, Melak; ADANE, Tiruneh; GETAWA, Solomon. Magnitude of coagulation abnormalities and associated factors among patients with heart diseases at the University of Gondar Comprehensive Specialized Hospital. *Vascular Health and Risk Management*, 2022, 617-627. https://doi.org/10.2147/VHRM.S371912

[9] 9. JODA, Baker; MOHAISEN, Huda R. Influence of Metal Nanoparticles on Blood Coagulation: Influence of Metal Nanoparticles. *Journal of Kerbala University*, 2025, 22.2: 13-19.

[10] 10. SALMAN, Sawsan T.; HUSSEIN, Areej A.; SAADI, Raakad K. Effect of combined oral contraception on coagulation profiles in women attending fertility control clinic in Baqubah City-Iraq. *Journal of the Faculty of Medicine Baghdad*, 2018, 60.1: 47-51. https://doi.org/10.32007/jfacmedbagdad.v60i1.44

[11] 11. ADCOCK, D. M., et al. International Council for Standardization in Haematology (ICSH) recommendations for the performance and interpretation of activated partial thromboplastin time and prothrombin time mixing tests. *International Journal of Laboratory Hematology*, 2024, 46.5: 777-788. https://doi.org/10.1111/ijlh.14344

[12] 12. RAZA, Sheharyar, et al. The historical origins of modern international normalized ratio targets. *Journal of Thrombosis and Haemostasis*, 2024, 22.8: 2184-2194. https://doi.org//10.1016/j.jtha.2024.05.013

[13] 13. FAVALORO, Emmanuel J. The most highly cited publications from Seminars in Thrombosis and Hemostasis: a data analysis 50 years in the making. In: *Seminars in Thrombosis and Hemostasis*. Thieme Medical Publishers, Inc., 2024. p. 157-168.

[14] 14. AL-ASSAF, Lubna AA; AL-ISSA, Yasser AH. Levels of Some Blood Clotting Factors in COVID-19 Patients: Comparative Study Before and After Pfizer-BioNTech Vaccinations. *Iraqi Journal of Science*, 2023, 4911-4917. https://doi.org/10.24996/ijs.2023.64.10.2

[15] 15. DEL BEN, Fabio, et al. Biological variation outweighs pre-analytical factors in coagulation reference intervals: a multicenter big data study. *Clinica Chimica Acta*, 2026, 120975.. https://doi.org/10.1016/j.cca.2026.120975

[16] 16. KAMAL, Arif H.; TEFFERI, Ayalew; PRUTHI, Rajiv K. How to interpret and pursue an abnormal prothrombin time, activated partial thromboplastin time, and bleeding time in adults. In: *Mayo Clinic Proceedings*. Elsevier, 2007. p. 864-873. https://doi.org/10.4065/82.7.864

[17] 17. ARAL, Hale, et al. Verifying reference intervals for coagulation tests by using stored data. *Scandinavian Journal of Clinical and Laboratory Investigation*, 2011, 71.8: 647-652. https://doi.org/10.3109/00365513.2011.618546

[18] 18. DEITCHER, Steven R. Interpretation of the international normalised ratio in patients with liver disease. *The Lancet*, 2002, 359.9300: 47-48. https://doi.org/10.1016/S0140-6736(02)07282-3

[19] 19. TRIPODI, Armando; MANNUCCI, Pier Mannuccio. The coagulopathy of chronic liver disease. *New England Journal of Medicine*, 2011, 365.2: 147-156. https://doi.org/10.1056/NEJMra052983

[20] 20. NORTHUP, Patrick G.; CALDWELL, Stephen H. Coagulation in liver disease: a guide for the clinician. *Clinical Gastroenterology and Hepatology*, 2013, 11.9: 1064-1074.

[21] 21. LISMAN, Ton; PORTE, Robert J. Pathogenesis, prevention, and management of bleeding and thrombosis in patients with liver diseases. *Research and practice in thrombosis and haemostasis*, 2017, 1.2: 150-161.

[22] 22. BAGWELL, C.; KOTTKE-MARCHANT, K.; DAVIS, B. H. Laboratory hematology practice. 2012

