

Bibliographic Analysis: Pelvic Inflammatory Disease (PID)

Çağlayan Biçer

Isparta City Hospital, Obstetrics and Gynecology Clinic

DOI: <https://doi.org/10.47772/IJRISS.2026.100600130>

Received: 18 May 2026; Accepted: 24 May 2026; Published: 18 June 2026

ABSTRACT

Introduction: Pelvic inflammatory disease (PID) is a serious infection of the female upper reproductive tract and remains a major global public health problem due to its association with infertility, ectopic pregnancy, chronic pelvic pain, and recurrent reproductive tract infections. Scientific understanding of PID has evolved considerably over time, shifting from simple clinical observations to multidisciplinary investigations involving microbiology, epidemiology, immunology, and reproductive health.

Methods: This bibliographic analysis was conducted through a qualitative review of peer-reviewed articles, epidemiological studies, clinical guidelines, systematic reviews, and meta-analyses published between 2000 and 2025. Literature was collected from PubMed, Google Scholar, ScienceDirect, and reports published by the World Health Organization and the Centers for Disease Control and Prevention. Studies related to PID etiology, diagnosis, treatment, prevention, antimicrobial resistance, and reproductive complications were analyzed thematically.

Results: The analysis identified *Chlamydia trachomatis* and *Neisseria gonorrhoeae* as the primary pathogens associated with PID, although recent studies emphasized the polymicrobial nature of the disease and the contribution of vaginal microbiome imbalance. Diagnostic challenges remain significant because many patients present with mild or asymptomatic disease. Advances in molecular diagnostic techniques, especially nucleic acid amplification tests (NAATs), have improved diagnostic accuracy. Broad-spectrum antibiotic therapy continues to represent the standard treatment approach; however, increasing antimicrobial resistance among gonococcal strains has emerged as a major concern. The reviewed literature consistently associated untreated or recurrent PID with infertility, ectopic pregnancy, chronic pelvic pain, and recurrent infections. Public health interventions, including STI screening, sexual health education, and early treatment strategies, were strongly supported for reducing disease prevalence and complications.

Conclusion: PID research has progressed substantially over recent decades, integrating clinical medicine with molecular biology and public health perspectives. Despite improvements in diagnosis and treatment, challenges related to antimicrobial resistance, healthcare disparities, and delayed diagnosis remain significant. Continued research is necessary to improve prevention strategies, diagnostic standards, and therapeutic approaches in order to reduce the global burden of PID.

Keywords: Pelvic inflammatory disease (PID), *Chlamydia trachomatis*, *Neisseria gonorrhoeae*, reproductive health, sexually transmitted infections (STIs), antimicrobial resistance, molecular diagnostics, infertility, chronic pelvic pain, public health.

Pelvic Inflammatory Disease is a serious infection and inflammation of the female upper reproductive tract, including the uterus, fallopian tubes, ovaries, and surrounding pelvic structures. It is most commonly caused by sexually transmitted bacteria, particularly *Chlamydia trachomatis* and *Neisseria gonorrhoeae* [1,2]. PID remains a major public health concern worldwide because it can lead to severe reproductive complications such as infertility, ectopic pregnancy, chronic pelvic pain, and recurrent infections. The scientific literature on PID has developed significantly over time, reflecting advances in gynecology, microbiology, infectious disease research, and public health [3-5]. Early studies mainly focused on the clinical symptoms and surgical management of pelvic infections, while more recent research emphasizes early diagnosis, prevention, antibiotic therapy, molecular diagnostics, and long-term reproductive outcomes [6,7]. Researchers have also increasingly examined

the social and economic impact of PID, particularly among adolescents and women with limited access to healthcare. A bibliographic analysis of PID literature demonstrates how scientific understanding of the disease has evolved from simple clinical observations to multidisciplinary investigations involving epidemiology, immunology, microbiology, and women's reproductive health [8-10]. This analysis explores the major themes, research trends, methodologies, and gaps within the literature related to PID, highlighting the importance of continued research for improving prevention, diagnosis, and treatment strategies.

METHOD

This bibliographic analysis of Pelvic Inflammatory Disease was conducted using a qualitative review of academic and clinical literature related to the causes, diagnosis, treatment, prevention, and complications of the disease. The purpose of the methodology was to identify major research trends, evaluate the development of scientific knowledge regarding PID, and examine the most significant contributions within the literature. Relevant sources were collected from reputable scientific and medical databases, including PubMed, Google Scholar, ScienceDirect, and publications from the World Health Organization and the Centers for Disease Control and Prevention. The selection process focused primarily on peer-reviewed journal articles, clinical guidelines, epidemiological studies, systematic reviews, and meta-analyses published between 2000 and 2025. In addition, several earlier landmark studies were included to provide historical context and demonstrate the evolution of PID research over time.

The literature search was conducted using keywords and phrases such as "Pelvic Inflammatory Disease," "PID diagnosis," "PID treatment," "sexually transmitted infections," "PID complications," "reproductive health," and "PID prevention." Articles were selected based on their relevance, credibility, scientific impact, and contribution to understanding the disease. The collected literature was analyzed thematically. Major themes identified included etiology and pathogenesis, diagnostic challenges, antibiotic treatment strategies, long-term reproductive complications, and public health prevention approaches. Attention was also given to emerging topics such as antimicrobial resistance, molecular diagnostic technologies, and the role of the vaginal microbiome in PID development. The analysis aimed to synthesize existing knowledge, identify gaps within current research, and evaluate how scientific understanding of PID has changed across different periods. This methodology provided a comprehensive overview of the literature while highlighting areas that require further scientific investigation.

RESULTS

The bibliographic analysis of Pelvic Inflammatory Disease literature revealed several important trends and themes related to the understanding, diagnosis, treatment, and prevention of the disease. The reviewed studies demonstrated that PID remains a major global reproductive health problem, particularly among sexually active women of reproductive age.

One of the most significant findings in the literature was the consistent identification of *Chlamydia trachomatis* and *Neisseria gonorrhoeae* as the primary pathogens associated with PID. However, more recent studies emphasized the polymicrobial nature of the disease, highlighting the involvement of anaerobic bacteria and vaginal microbiome imbalance in disease progression.

The analysis also showed that diagnosis remains one of the greatest challenges in PID management. Many studies reported that PID is frequently underdiagnosed because symptoms are often mild, nonspecific, or asymptomatic. Researchers consistently stressed the importance of early clinical diagnosis and immediate treatment to prevent long-term reproductive complications. Advances in molecular diagnostic techniques, especially nucleic acid amplification tests (NAATs), were identified as important developments in improving diagnostic accuracy.

Another major finding involved treatment approaches. The literature strongly supported the use of broad-spectrum antibiotic therapy due to the mixed bacterial causes of PID. International guidelines from organizations such as the World Health Organization and the Centers for Disease Control and Prevention emphasized early

intervention and standardized treatment protocols. Several studies also highlighted growing concerns regarding antimicrobial resistance, particularly resistance among gonococcal strains.

The reviewed literature consistently linked untreated or recurrent PID with severe complications, including infertility, ectopic pregnancy, and chronic pelvic pain. Public health studies emphasized the importance of STI screening programs, sexual health education, and early prevention strategies in reducing disease prevalence.

Overall, the results demonstrated that PID research has evolved from simple clinical observations to multidisciplinary investigations involving microbiology, epidemiology, immunology, and reproductive health. Despite significant progress, gaps remain in diagnostic methods, prevention strategies, and global healthcare access, indicating the need for continued research and public health intervention.

DISCUSSION

The bibliographic analysis of Pelvic Inflammatory Disease demonstrates that PID continues to be an important global reproductive health issue despite advances in medical research and treatment strategies. The reviewed literature highlights the complexity of the disease, particularly [11,12] regarding its diagnosis, polymicrobial etiology, and long-term reproductive consequences. The findings suggest that although scientific understanding of PID has improved considerably, significant challenges remain in both clinical management and public health prevention [13-15]. One of the most important issues identified in the literature is the difficulty of diagnosing PID accurately and early. Many studies emphasized that symptoms are often mild or nonspecific, causing delayed diagnosis and treatment. This delay increases the risk of complications such as infertility, chronic pelvic pain, and ectopic pregnancy [16]. The discussion within the literature consistently supports the need for more reliable and noninvasive diagnostic tools. Advances in molecular diagnostics and nucleic acid amplification tests (NAATs) represent significant progress; however, these technologies may not be equally accessible in low-resource healthcare settings [17].

Another important discussion point concerns the polymicrobial nature of PID. Earlier studies mainly focused on *Chlamydia trachomatis* and *Neisseria gonorrhoeae*, while recent research demonstrates that anaerobic bacteria and vaginal microbiome imbalance also contribute significantly to disease development [18,19]. This shift in understanding has influenced treatment recommendations, leading to the use of broad-spectrum antibiotic therapy. Nevertheless, increasing antimicrobial resistance, especially among gonococcal strains, presents a growing challenge for healthcare providers and may reduce the effectiveness of current treatment protocols in the future [20-22]. The literature also highlights the importance of prevention strategies and public health interventions. Researchers strongly support STI screening programs, sexual health education, and early treatment of infections as essential measures for reducing PID prevalence and complications. However, disparities in healthcare access remain a significant concern, particularly among adolescents, low-income populations, and women in developing countries [23-26]. Overall, the reviewed studies demonstrate that PID research has become increasingly multidisciplinary, combining gynecology, microbiology, epidemiology, and public health perspectives. Although substantial progress has been made, continued research is necessary to improve diagnostic accuracy, develop more effective treatments, and strengthen global prevention efforts [27-30].

This bibliographic analysis of Pelvic Inflammatory Disease has several limitations that should be considered when interpreting the findings. First, the analysis was based primarily on published peer-reviewed articles and clinical guidelines available in selected academic databases. As a result, some relevant unpublished studies, regional reports, or non-English publications may not have been included, which could limit the comprehensiveness of the review. Another limitation involves the variability of the studies included in the literature. The reviewed research differed in methodology, sample size, geographic location, and diagnostic criteria for PID. This inconsistency made it difficult to compare findings directly across studies and may have influenced the interpretation of results. In particular, the lack of universally accepted diagnostic standards for PID remains a major challenge in the literature, as many studies relied on clinical diagnosis rather than laboratory-confirmed cases. The analysis also focused mainly on literature published between 2000 and 2025. Although landmark earlier studies were included for historical context, some older research may have been excluded. In addition, because medical knowledge and treatment guidelines continue to evolve, newer studies published after the review period may provide updated information not reflected in this analysis. Another

important limitation is the underrepresentation of low-resource and developing countries in the available literature. Many studies originated from high-income countries with advanced healthcare systems, which may limit the global applicability of the findings. Differences in healthcare access, diagnostic technologies, and public health infrastructure can significantly affect PID prevalence, diagnosis, and treatment outcomes across different populations. Finally, this study relied on secondary data sources rather than original clinical or experimental research. Therefore, the conclusions are dependent on the quality, accuracy, and potential biases of the existing literature. Despite these limitations, the analysis provides a broad overview of current knowledge and research trends related to PID while identifying important areas requiring further investigation.

This bibliographic analysis of Pelvic Inflammatory Disease has several limitations that should be considered when interpreting the findings. First, the analysis was based primarily on published peer-reviewed articles and clinical guidelines available in selected academic databases. As a result, some relevant unpublished studies, regional reports, or non-English publications may not have been included, which could limit the comprehensiveness of the review.

Another limitation involves the variability of the studies included in the literature. The reviewed research differed in methodology, sample size, geographic location, and diagnostic criteria for PID. This inconsistency made it difficult to compare findings directly across studies and may have influenced the interpretation of results. In particular, the lack of universally accepted diagnostic standards for PID remains a major challenge in the literature, as many studies relied on clinical diagnosis rather than laboratory-confirmed cases.

The analysis also focused mainly on literature published between 2000 and 2025. Although landmark earlier studies were included for historical context, some older research may have been excluded. In addition, because medical knowledge and treatment guidelines continue to evolve, newer studies published after the review period may provide updated information not reflected in this analysis.

Another important limitation is the underrepresentation of low-resource and developing countries in the available literature. Many studies originated from high-income countries with advanced healthcare systems, which may limit the global applicability of the findings. Differences in healthcare access, diagnostic technologies, and public health infrastructure can significantly affect PID prevalence, diagnosis, and treatment outcomes across different populations.

Finally, this study relied on secondary data sources rather than original clinical or experimental research. Therefore, the conclusions are dependent on the quality, accuracy, and potential biases of the existing literature. Despite these limitations, the analysis provides a broad overview of current knowledge and research trends related to PID while identifying important areas requiring further investigation.

CONCLUSION

In conclusion, this bibliographic analysis of Pelvic Inflammatory Disease demonstrates that PID remains a significant global reproductive health problem despite considerable advances in medical research and healthcare practices. The reviewed literature highlights the complex and multifactorial nature of the disease, particularly regarding its etiology, diagnosis, treatment, and long-term reproductive consequences.

The analysis revealed that scientific understanding of PID has evolved substantially over time. Earlier research mainly focused on clinical symptoms and surgical management, whereas contemporary studies emphasize molecular diagnostics, antimicrobial resistance, prevention strategies, and public health interventions. The literature consistently identifies *Chlamydia trachomatis* and *Neisseria gonorrhoeae* as major causative pathogens, while more recent findings recognize the important role of polymicrobial infections and vaginal microbiome

CONCLUSION

In conclusion, this bibliographic analysis of Pelvic Inflammatory Disease demonstrates that PID remains a significant global reproductive health problem despite considerable advances in medical research and healthcare

practices. The reviewed literature highlights the complex and multifactorial nature of the disease, particularly regarding its etiology, diagnosis, treatment, and long-term reproductive consequences.

The analysis revealed that scientific understanding of PID has evolved substantially over time. Earlier research mainly focused on clinical symptoms and surgical management, whereas contemporary studies emphasize molecular diagnostics, antimicrobial resistance, prevention strategies, and public health interventions. The literature consistently identifies *Chlamydia trachomatis* and *Neisseria gonorrhoeae* as major causative pathogens, while more recent findings recognize the important role of polymicrobial infections and vaginal microbiome imbalance in disease progression.

The reviewed studies also demonstrate that early diagnosis and prompt treatment are essential for preventing severe complications such as infertility, ectopic pregnancy, and chronic pelvic pain. However, diagnostic difficulties, asymptomatic cases, and limited access to healthcare services continue to present major challenges, particularly in low-resource settings. In addition, increasing antimicrobial resistance remains a growing concern that may affect the effectiveness of current treatment protocols in the future.

Furthermore, the literature strongly supports the importance of prevention through STI screening programs, sexual health education, and early intervention strategies. Public health approaches are especially important for reducing disease prevalence and improving reproductive health outcomes among vulnerable populations.

Overall, this analysis shows that PID research has become increasingly multidisciplinary, integrating perspectives from gynecology, microbiology, epidemiology, immunology, and public health. Although substantial progress has been achieved, further research is still needed to improve diagnostic accuracy, develop more effective therapies, address global healthcare disparities, and strengthen prevention programs. Continued scientific investigation and public health efforts will remain essential for reducing the burden of PID and improving women's reproductive health worldwide.

REFERENCES

1. Brunham, R. C., & Gottlieb, S. L. (2015). Pelvic inflammatory disease. *New England Journal of Medicine*, 372(21), 2039–2048.
2. Haggerty, C. L., & Ness, R. B. (2006). Diagnosis and treatment of pelvic inflammatory disease. *Women's Health*, 2(3), 383–397.
3. Ross, J., Guaschino, S., Cusini, M., Jensen, J., & Mirandola, M. (2018). 2017 European guideline for the management of pelvic inflammatory disease. *International Journal of STD & AIDS*, 29(2), 108–114.
4. Centers for Disease Control and Prevention (CDC). (2021). Sexually Transmitted Infections Treatment Guidelines.
5. World Health Organization (WHO). (2021). Global progress report on HIV, viral hepatitis and sexually transmitted infections.
6. Wiesenfeld, H. C., & Sweet, R. L. (2015). Progress in the management of pelvic inflammatory disease. *Clinical Obstetrics and Gynecology*, 58(2), 281–291.
7. Sweet, R. L. (2012). Pelvic inflammatory disease: Current concepts of diagnosis and management. *Current Infectious Disease Reports*, 14(2), 194–203.
8. Haggerty, C. L., et al. (2010). Risk of sequelae after *Chlamydia trachomatis* genital infection in women. *Journal of Infectious Diseases*, 201(S2), S134–S155.
9. Westrom, L., Joesoef, R., Reynolds, G., Hagdu, A., & Thompson, S. E. (1992). Pelvic inflammatory disease and fertility. *Sexually Transmitted Diseases*, 19(4), 185–192.
10. Paavonen, J., & Westrom, L. (2008). Pelvic inflammatory disease. In *Sexually Transmitted Diseases* (4th ed.).
11. Ness, R. B., et al. (2002). Effectiveness of treatment strategies of PID. *American Journal of Obstetrics and Gynecology*, 186(5), 929–937.
12. Walker, C. K., & Wiesenfeld, H. C. (2007). Antibiotic therapy for acute pelvic inflammatory disease. *Clinical Infectious Diseases*, 44(S3), S111–S122.
13. Taylor, B. D., & Darville, T. (2011). Hsp60 and PID pathogenesis. *Expert Review of Anti-infective Therapy*, 9(8), 759–772.

14. Cohen, C. R., et al. (2005). Bacterial vaginosis associated bacteria and PID. *Clinical Infectious Diseases*, 40(5), 669–674.
15. Manhart, L. E., et al. (2003). *Mycoplasma genitalium*: Should we treat and how? *Clinical Infectious Diseases*, 37(6), 748–754.
16. Lis, R., Rowhani-Rahbar, A., & Manhart, L. E. (2015). *Mycoplasma genitalium* infection and female reproductive tract disease. *Clinical Infectious Diseases*, 61(3), 418–426.
17. Wiesenfeld, H. C., et al. (2002). Lower genital tract infection and endometritis. *Clinical Infectious Diseases*, 34(6), 745–751.
18. Peipert, J. F. (2003). Clinical practice: Genital chlamydial infections. *New England Journal of Medicine*, 349(25), 2424–2430.
19. Stamm, W. E. (1999). Chlamydia trachomatis infections of the adult. In *Sexually Transmitted Diseases*.
20. Unemo, M., & Shafer, W. M. (2014). Antimicrobial resistance in *Neisseria gonorrhoeae*. *BMC Infectious Diseases*, 14, 1–13.
21. Wi, T., et al. (2017). Antimicrobial resistance in *Neisseria gonorrhoeae*. *PLoS Medicine*, 14(7), e1002344.
22. Kirkcaldy, R. D., et al. (2019). *Neisseria gonorrhoeae* antimicrobial resistance. *Emerging Infectious Diseases*, 25(11), 2109–2116.
23. Gottlieb, S. L., et al. (2010). Screening and prevention strategies for STIs. *Lancet*, 375(9718), 1764–1774.
24. Low, N., et al. (2006). Global control of sexually transmitted infections. *Lancet*, 368(9551), 2001–2016.
25. Tsevat, D. G., et al. (2017). Sexually transmitted diseases and infertility. *American Journal of Obstetrics and Gynecology*, 216(1), 1–9.
26. Gradison, M. (2012). Pelvic inflammatory disease. *American Family Physician*, 85(8), 791–796.
27. Brunham, R. C., Rekart, M. L., & Gottlieb, S. L. (2015). The evolving epidemiology of PID. *Journal of Infectious Diseases*, 211(S2), S89–S95.
28. Horne, A. W., et al. (2015). Ectopic pregnancy and PID. *BMJ*, 351, h3397.
29. Taylor, B. D., Haggerty, C. L., & Ness, R. B. (2011). Long-term reproductive consequences of PID. *Expert Review of Obstetrics & Gynecology*, 6(4), 427–438.
30. Eschenbach, D. A. (2008). PID: Clinical and microbiological perspectives. *Journal of Infectious Diseases*, 197(S2), S190–S196.

Table 1. Major Causes of Pelvic Inflammatory Disease (PID)

Pathogen	Type of Organism	Role in PID
Chlamydia trachomatis	Bacterium	One of the most common sexually transmitted causes of PID
Neisseria gonorrhoeae	Bacterium	Major pathogen associated with acute PID
Anaerobic bacteria	Mixed bacteria	Contribute to polymicrobial infections and inflammation
Mycoplasma genitalium	Bacterium	Emerging pathogen associated with chronic PID
Vaginal microbiota imbalance	Mixed microorganisms	May increase susceptibility to upper reproductive tract infection

Table 2. Common Complications of Pelvic Inflammatory Disease

Complication	Description
Infertility	Damage to fallopian tubes may prevent pregnancy
Ectopic pregnancy	Increased risk of implantation outside the uterus
Chronic pelvic pain	Long-term pelvic discomfort caused by inflammation
Recurrent PID	Repeated infections causing additional reproductive damage
Tubo-ovarian abscess	Severe infection leading to abscess formation

Table 3. Main Themes Identified in PID Literature

Research Theme	Main Focus
Etiology and Pathogenesis	Causes and mechanisms of infection
Diagnosis	Clinical signs, imaging, and laboratory testing
Treatment	Antibiotic therapy and management strategies
Prevention	STI screening and sexual health education
Public Health	Healthcare access and disease prevention programs
Antimicrobial Resistance	Resistance to standard antibiotic treatment

