Vesicolithiasis Concealing a Migrated Intravesical Copper Intrauterine Device Successfully Treated by Cystolithotripsy and Endoscopic Removal: A Case Report

Patria Putrapratama[1], Wikan Kurniawan[2], Trisula Utomo[1*]

[1]Division of Urology, Department of Surgery, Faculty of Medicine, Nursing, and Public Health, Universitas Gadjah Mada/Sardjito Hospital
[2]Department of Urology, Academic Hospital, Universitas Gadjah Mada

*Email correspondence: trisula.utomo@ugm.ac.id

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Abstract

Migration of a copper intrauterine device (Cu-IUD) into the urinary bladder is a rare and often delayed complication of long-term IUD use that may present with vesicolithiasis and recurrent urinary tract infection (UTI), while the migrated device may be concealed by stone formation, making diagnosis challenging. We report the case of a 34-year-old woman who presented with a four-month history of lower urinary tract symptoms (LUTS) and recurrent UTI, with a history of Cu-IUD insertion four years earlier without routine follow-up. Urologic ultrasonography revealed a hyperechoic bladder lesion suggestive of a bladder calculus. Cystoscopy followed by single-session cystolithotripsy revealed a T-shaped encrusted calculus concealing a migrated Cu-IUD. Cystolithotripsy was performed using a stone punch, followed by transurethral extraction of the underlying device, with a total operative duration of approximately 30 minutes. Inspection of the removed device confirmed a copper-containing T-shaped IUD, while stone analysis demonstrated a predominantly struvite, infection-related composition. At the two-week follow-up, the patient experienced complete symptom resolution, with no residual stone or foreign body identified on radiographic evaluation, indicating that intravesical Cu-IUD migration should be considered in women with recurrent UTI and vesicolithiasis, particularly in those with a history of IUD insertion without routine follow-up, and that single-session endoscopic cystolithotripsy with extraction of the migrated device is a safe, feasible, and minimally invasive treatment option with favorable clinical outcomes.

Keywords: Vesicolithiasis, Intrauterine Device Migration, Cystolithotripsy, Urinary Tract Infection, Case Report

INTRODUCTION

A copper-T intrauterine device (Cu-IUD) is a widely used contraceptive method with high efficacy, providing a pregnancy prevention rate of more than 99% (Maclean Bunting et al., 2024). Since its introduction by Tatum and Zipper in 1969, the Cu-IUD has become a widely accepted contraceptive option because of its effectiveness, convenience, long-term usability, and non-hormonal characteristics (Maclean Bunting et al., 2024; Makary & Rathore, 2021). Its contraceptive effect is primarily mediated through interference with sperm migration and fertilization (Maclean Bunting et al., 2024). Although generally safe, uterine perforation is a recognized complication of IUD insertion, occurring in approximately 1.9–3.6 per 1,000 insertions, and may subsequently lead to migration of the device into adjacent organs (Kalathia et al., 2023; G. Liu et al., 2021).

Although rare, intravesical migration represents an important complication of IUD use. A systematic review identified the urinary bladder as the second most common site of ectopic IUD migration after the intestine (Venkataramani et al., 2024). Importantly, IUD migration may remain asymptomatic for several years, resulting in a prolonged latent period before clinical presentation. Once the Cu-IUD enters the bladder, it acts as a foreign body and may serve as a nidus for progressive encrustation and bladder stone (vesicolithiasis) formation (Muhammad et al., 2021). Over time, extensive stone formation may completely cover and obscure the migrated IUD, creating a diagnostic pitfall in which the underlying foreign body is not readily identified on initial imaging, and the lesion may be misinterpreted as a simple bladder calculus. We report a case of intravesical Cu-IUD migration presenting as vesicolithiasis and recurrent urinary tract infection following a prolonged clinically silent period, in which the migrated device was initially concealed by extensive stone formation. The patient was successfully treated with single-session endoscopic cystolithotripsy followed by transurethral removal of the migrated Cu-IUD.

METHOD

The study design was a retrospective single-case report involving a female patient (n = 1) diagnosed with intravesical migration of a copper-T intrauterine device (Cu-IUD) associated with vesicolithiasis. The study was conducted at Dr. Sardjito General Hospital, Division of Urology, Department of Surgery, Faculty of Medicine, Public Health, and Nursing, Universitas Gadjah Mada, Yogyakarta, Indonesia. Clinical information was obtained from the patient's medical records, including demographic characteristics, presenting complaints, contraceptive and gynecological history, past medical and surgical history, physical examination findings, urinalysis results, hematological and biochemical parameters, coagulation profile, and urological imaging findings. Ultrasonography of the kidneys, ureters, and bladder was performed as the initial imaging modality and demonstrated a hyperechoic intravesical lesion with posterior acoustic shadowing, suggestive of a bladder calculus.

The clinical course and management were described chronologically, including diagnostic cystoscopy, cystolithotripsy using a stone punch, transurethral extraction of the migrated Cu-IUD, perioperative care, microbiological evaluation, stone composition analysis, and postoperative follow-up. The procedure was performed using a rigid cystoscope with a 21 Fr sheath, and a 16 Fr Foley catheter was inserted at the conclusion of the procedure. The main clinical outcomes assessed were successful removal of the bladder stone and migrated Cu-IUD, perioperative complications, resolution of lower urinary tract symptoms and recurrent urinary

tract infection, microbiological findings, stone composition, and the presence of residual stone or foreign body on follow-up imaging. At the 2-week follow-up, symptom resolution and absence of residual bladder stones or foreign bodies were confirmed. This case report was prepared in accordance with the Surgical Case Report (SCARE) 2020 criteria. Written informed consent was obtained from the patient for publication of the case report and accompanying images.

RESULTS

A 34-year-old woman was referred to our urology clinic with a 4-month history of persistent lower urinary tract symptoms (LUTS), including frequency, urgency, and dysuria, associated with recurrent urinary tract infections (UTI) requiring repeated courses of antibiotics. She reported at least two episodes of symptomatic infection during the preceding 4 months, with transient improvement following antibiotic treatment and recurrence of symptoms shortly thereafter. She denied gross hematuria, suprapubic pain, and flank.

She had undergone two prior vaginal deliveries before initiating contraceptive use. Her gynecologic history was notable for the insertion of an intrauterine device (IUD) 4 years earlier for contraceptive purposes. She could not clearly recall the type of IUD used, and no routine follow-up had been performed after insertion. There was no history of recent pregnancy, and she denied any recent pelvic trauma. She also had no history of previous surgery. Her past medical history was otherwise unremarkable, with no known diabetes mellitus, chronic kidney disease, immunosuppression, or prior urolithiasis. She was not taking any regular medications and had no known drug allergies. Her family history was unremarkable for renal, urological, or hereditary disease.

Table 1. Summary of the clinical events.

June 2016	August 2019	November 2021	August 2025	December 2025	January 2026
First vaginal delivery.	Second vaginal delivery.	The Cu-IUD insertion for contraception without routine follow-up.	Onset of LUTS and recurrent UTI.	Cystoscopy and cystolithotripsy revealed encrusted intravesical Cu-IUD; stone fragmented with stone punch and Cu-IUD removed endoscopically.	Complete symptom resolution and no residual stone/foreign body on follow-up imaging.

Psychosocially, the patient was a housewife who remained active in her daily household activities. Despite her urinary symptoms, she reported strong family support and no significant psychological distress or socioeconomic barriers to seeking medical care. There was no history suggestive of behavioral, occupational, or environmental factors that could have contributed to

her condition. Furthermore, no relevant genetic predisposition to urological, gynecological, or connective tissue disorders was identified or suspected based on her family and clinical history. A summary of the clinical course is presented in Table 1.

On physical examination, the patient was afebrile and hemodynamically stable. Abdominal examination revealed no suprapubic tenderness or palpable mass, and there was no costovertebral angle tenderness. External genital examination showed a normal urethral meatus without discharge or inflammation. Urinalysis demonstrated pyuria and bacteriuria, consistent with a urinary tract infection. Laboratory evaluation showed a leukocyte count of 7.2 × 10^3/µL (reference range: 4.0–11.0 × 10^3/µL), hemoglobin 12.2 g/dL (12.0–16.0 g/dL), platelet count 342 × 10^3/µL (150–450 × 10^3/µL), blood urea nitrogen (BUN) 12 mg/dL (7–20 mg/dL), serum creatinine 0.91 mg/dL (0.6–1.1 mg/dL), sodium 143 mmol/L (135–145 mmol/L), potassium 3.8 mmol/L (3.5–5.0 mmol/L), chloride 102 mmol/L (98–106 mmol/L), prothrombin time (PT) 10.2 sec (reference/control: 11.0 sec), activated partial thromboplastin time (aPTT) 33.1 sec (reference/control: 31.2 sec), international normalized ratio (INR) 0.98 (0.8–1.2), albumin 4.71 g/dL (3.5–5.0 g/dL), and random blood glucose 92 mg/dL (70–140 mg/dL); hepatitis B surface antigen (HBsAg) was non-reactive. Apart from the urinalysis findings, the hematologic, renal, electrolyte, coagulation, and metabolic parameters were within their respective reference ranges.

Figure 1. Urologic ultrasound examination showing a hyperechoic lesion with posterior acoustic shadowing within the urinary bladder suggestive of a bladder calculus.

Urologic ultrasonography of the kidneys, ureters, and bladder demonstrated a hyperechoic intravesical lesion with posterior acoustic shadowing, suspected as a bladder calculus (Figure 1). Both kidneys were normal in size and echotexture, with no hydronephrosis. The suspected calculus appeared to approximate the dimensions of the underlying IUD; however, an exact measurement was not documented during ultrasonography. Nevertheless, the device itself could not be clearly distinguished on the initial ultrasonographic examination. Based on the clinical presentation and ultrasonographic findings, the patient was scheduled for diagnostic cystoscopy and cystolithotripsy.

The initial approach was endoscopic, with a plan for diagnostic cystoscopy and cystolithotripsy based on ultrasonographic findings suggestive of bladder stones. Under spinal anesthesia and in the lithotomy position, cystoscopic evaluation was performed using a rigid cystoscope with a 21 Fr sheath. Cystoscopic examination revealed vesicolithiasis within the bladder lumen, with a characteristic T-shaped configuration consistent with an encrusted Cu-IUD (Figure 2). No additional intravesical pathology was identified. Stone fragmentation was performed using a stone punch under direct cystoscopic visualization. The stone was successfully fragmented into smaller pieces, which were subsequently evacuated using saline irrigation and bladder washout. After adequate clearance of the stone debris, the migrated Cu-IUD was clearly visualized, grasped, and removed transurethrally without difficulty (Figure 3). Inspection of the bladder mucosa revealed mild inflammatory changes surrounding the contact area of the foreign body, with no evidence of active bleeding, significant mucosal injury, or bladder perforation. A 16 Fr Foley catheter was inserted at the end of the procedure to allow temporary urinary drainage and bladder rest. The total operative time was approximately 30 minutes, and the procedure was completed without intraoperative complications. Several fragmented stone specimens and a urine sample were sent for laboratory analysis, including stone composition analysis, urine culture, and antibiotic susceptibility testing.

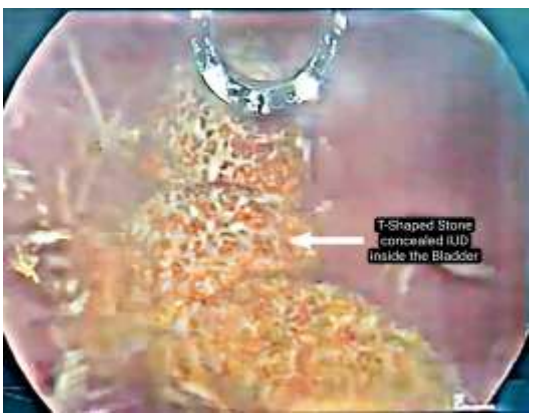

Figure 2. Vesicolithiasis concealed Cu-IUD inside the bladder with a characteristic of T-shaped configuration during cystoscopic examination

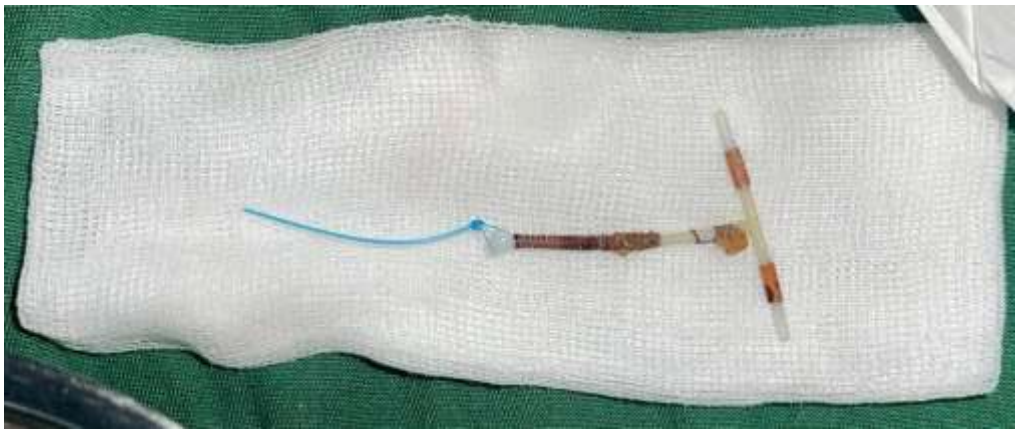

Figure 3. The appearance of the encrusted Cu-IUD that was successfully evacuated transurethrally

During hospitalization, the postoperative course was uneventful. The patient received intravenous ceftriaxone 1000 mg every 12 hours as empirical antibiotic therapy. Six hours after the procedure, the Foley catheter drained clear yellow urine, and the patient remained hemodynamically stable without fever or gross hematuria. No perioperative complications such as bladder injury, urinary retention, or systemic infection were observed. The Foley catheter was removed on postoperative day 4, and the patient was able to void spontaneously without difficulty. Urine culture demonstrated growth of Escherichia coli susceptible to cefixime. Antimicrobial therapy was subsequently transitioned to oral cefixime 200 mg every 12 hours for 5 days according to the available susceptibility result. Diclofenac sodium 50 mg was prescribed as needed for postoperative analgesia.

The available medical record did not clearly document whether the urine specimen was collected before or after the first dose of empirical ceftriaxone. This represents a limitation in interpreting the microbiological findings and antimicrobial management.

At the 2-week follow-up visit, the patient reported complete resolution of urinary urgency and dysuria, with no further episodes of UTI. Follow-up urinalysis showed improvement of pyuria and bacteriuria, although quantitative values were unavailable. Stone analysis revealed that the calculus was predominantly composed of magnesium ammonium phosphate (struvite) (60%), followed by carbonate apatite (30%) and calcium oxalate dihydrate (10%), consistent with infection-related stone formation. A follow-up kidney-ureter-bladder (KUB) radiograph demonstrated no residual bladder stone or intravesical foreign body (Figure 4). Because follow-up was limited to 2 weeks, long-term recurrence of bladder stone formation, UTI, or delayed complications could not be assessed.

Figure 4. The KUB radiograph evaluation showed no residual stone or foreign body in the bladder

DISCUSSION

Intravesical IUD migration is an uncommon but clinically important complication of IUD use. Uterine perforation may occur at the time of insertion or develop subsequently through gradual erosion of the uterine wall, allowing migration into adjacent structures, including the urinary bladder (Bakri et al., 2023; Saputra & Permatasari, 2023; Venkataramani et al., 2024). Two mechanisms have been proposed for extrauterine IUD migration. Primary perforation may occur during insertion, whereas delayed secondary perforation may result from gradual erosion of the uterine wall following an apparently uncomplicated placement. Factors that may contribute to delayed migration include chronic myometrial contractions, local inflammatory reactions to the IUD as a foreign body, postpartum uterine changes, and the anatomical relationship between the uterus and adjacent pelvic organs (Yu et al., 2024). Once the device approaches or penetrates the bladder wall, repetitive bladder contractions and fluctuations in intravesical pressure during the micturition cycle may theoretically further facilitate progressive erosion and intravesical migration. Since vesicolithiasis is relatively uncommon in women, its presence in female patients should raise suspicion of secondary causes such as intravesical foreign bodies or migrated devices (Jaziri et al., 2025; Şam et al., 2024,).

In the present case, urinary symptoms developed approximately four years after IUD insertion without a recognized acute perforation event. This prolonged interval is compatible with delayed secondary perforation rather than an immediately recognized insertion-related perforation (Gavali et al., 2021; Yu et al., 2024). Chronic myometrial contractions may have gradually displaced the device toward the bladder, while a persistent local inflammatory response to the foreign body could have promoted tissue erosion (C. Liu et al., 2024).

Repetitive bladder contractions during filling and micturition may also have contributed to progressive migration once the device reached the bladder wall. Nevertheless, these mechanisms remain hypothetical in this patient because routine post-insertion gynecologic follow-up and interval imaging were unavailable; therefore, the precise timing and mechanism of perforation cannot be definitively established. Clinical manifestations of intravesical IUD migration are variable and may include dysuria, urinary frequency, urgency, hematuria, pelvic or suprapubic pain, recurrent UTI, and other LUTS (Askarova et al., 2025; Malki et al., 2025; Varlas et al., 2024; Zapata et al., 2025; Varlas et al., 2024; Askarova et al., 2025; Torres Zapata et al., 2025; Malki et al., 2025). These symptoms are nonspecific and may delay recognition of the underlying foreign body (Askarova et al., 2025; Malki et al., 2025).

A major diagnostic challenge in the present case was extensive mineral encrustation around the migrated device. Initial ultrasonography demonstrated findings consistent with a bladder stone but did not clearly identify the underlying IUD. The T-shaped configuration became apparent during cystoscopy, and the Cu-IUD itself was clearly identified only after fragmentation of the surrounding calculus (Gupta et al., 2024). Thus, a detailed history of previous IUD placement remains important when evaluating bladder stones in women, particularly when the stone has an unusual configuration or is accompanied by persistent LUTS or recurrent UTI (Elawdy et al., 2024; Ali et al., 2024). Pre-existing stones may become complicated by superimposed UTI (Adhikari et al., 2022).

Bladder stone formation associated with migrated IUDs has been described in previous reports. Research carried out by Muhammad et al. (2021) reported a giant vesical calculus associated with a migrated intrauterine contraceptive device, while Piriyev et al. (2024) described bladder stone formation following displacement of a Cu-IUD. Similarly, Yu et al., (2024) reported an IUD partially migrating into the bladder with subsequent stone formation. Collectively, these reports demonstrate that the clinical and anatomical presentations vary considerably, ranging from partial bladder-wall penetration to complete intravesical migration and from limited encrustation to extensive stone formation.

The current case adds to this literature by demonstrating extensive T-shaped stone encrustation that substantially concealed the migrated device and initially mimicked a primary bladder calculus on ultrasonography. Stone analysis demonstrated a mixed calculus consisting predominantly of struvite (60%), with carbonate apatite (30%) and calcium oxalate dihydrate (10%). The predominance of struvite is clinically relevant given the patient's history of recurrent UTIs. Struvite stones are infection-related calculi composed primarily of magnesium ammonium phosphate and typically form in alkaline urine in the presence of urease-producing

bacteria. Bacterial urease hydrolyzes urea into ammonia, increasing urinary pH and promoting supersaturation and precipitation of magnesium ammonium phosphate. The presence of a chronically migrated Cu-IUD may have provided an additional foreign-body surface for bacterial adherence, crystal nucleation, and progressive mineral deposition, potentially facilitating the extensive encrustation observed in this patient.

However, the urine culture obtained during the present episode grew Escherichia coli, which is not typically considered a major urease-producing urinary pathogen (Halinski et al., 2023; Al et al., 2024). Therefore, the finding of E. coli should not be interpreted as evidence that this organism directly caused the struvite-predominant calculus. The stone composition, together with the history of recurrent UTIs, may instead reflect previous infection with a urease-producing organism that was no longer detectable at the time of the perioperative culture (Halinski et al., 2022). Polymicrobial infection, temporal changes in urinary microbiology, or chronic bacterial colonization and biofilm formation on the migrated IUD also cannot be excluded because previous urine culture data were unavailable (Al et al., 2024). Therefore, the calculus in this patient is more appropriately interpreted as a foreign-body-associated bladder stone with a substantial infection-related mineral component rather than as a stone caused entirely by the documented E. coli infection. Treatment of migrated IUDs involving the urinary bladder depends on the extent of migration, stone burden, bladder-wall involvement, associated injury or fistula, and feasibility of endoscopic extraction (Heaney et al., 2023; Houmaid et al., 2024). Previously reported approaches include cystoscopic extraction, transurethral cystolithotripsy, laparoscopic removal, open cystolithotomy, and combined techniques (Heaney et al., 2023; Houmaid et al., 2024; Piriyev et al., 2024; Varlas et al., 2024).

In the present case, the device was accessible through the bladder lumen, and cystoscopy showed no major bladder-wall injury or fistulous opening. Because extensive encrustation prevented intact extraction, fragmentation of the surrounding calculus using a stone punch allowed the Cu-IUD to be subsequently removed transurethrally. This approach enabled diagnosis and treatment during the same procedure while avoiding open surgery (Gupta et al., 2024; Jaziri et al., 2025). An advantage of the stone punch lithotriptor is that it permits direct visualization of the calculus during fragmentation, thereby reducing the risk of mucosal trauma or bladder perforation. Although the procedure was completed without perioperative complications in this patient, a single case cannot establish the overall safety or superiority of this technique. Endoscopic management should therefore be considered according to individual anatomy, the degree of device migration and encrustation, available expertise, and the presence or absence of associated pelvic or bladder injury (Şam et al., 2024). This case also emphasizes

the potential importance of follow-up after IUD insertion. In patients in whom IUD position becomes uncertain or migration is clinically suspected, appropriate gynecologic evaluation and imaging may facilitate earlier recognition of malposition or perforation before urinary complications develop (Houmaid et al., 2024; Jaziri et al., 2025).

Several limitations should be acknowledged. First, the exact stone dimensions were not objectively recorded during ultrasonography or cystoscopy; therefore, no retrospective numerical estimate was provided. Second, quantitative baseline urinalysis, previous urine cultures, and details of antibiotics administered before referral were unavailable, limiting objective confirmation and characterization of the reported recurrent UTI episodes. Third, the timing of the perioperative urine culture relative to the first ceftriaxone dose could not be established. Fourth, documentation regarding the presence or absence of IUD retrieval strings before surgery was unavailable. Fifth, the precise timing and mechanism of uterine perforation and intravesical migration could not be determined. Finally, follow-up was limited to 2 weeks, which is insufficient to evaluate long-term recurrence of UTI, bladder stone formation, or delayed pelvic complications. Despite these limitations, the case highlights an important diagnostic consideration: a migrated IUD may remain clinically silent for years and subsequently become extensively encrusted and concealed within a bladder stone. Awareness of this possibility, careful review of contraceptive history, cystoscopic assessment, complete foreign-body extraction, and evaluation for associated bladder injury are important components of management.

CONCLUSION

Intravesical IUD migration should be considered in women presenting with unexplained bladder stones, persistent LUTS, or recurrent UTI, particularly in those with a history of IUD insertion without documented follow-up. Extensive encrustation may conceal the migrated device and mimic a primary bladder stone on initial imaging. Endoscopic cystolithotripsy with device extraction may provide a feasible minimally invasive treatment option in appropriately selected patients. Importantly, regular follow-up after IUD insertion, including assessment of device position when clinically indicated, is essential for early detection of malposition or migration and may help prevent late complications such as recurrent UTI, extensive encrustation, and bladder stone formation.

REFERENCES

Al-Mutawtah, M., Campbell, E., Kubis, H. P., & Erjavec, M. (2023). Women's experiences of social support during pregnancy: a qualitative systematic review. *BMC Pregnancy and Childbirth*, *23*(1). https://doi.org/10.1186/s12884-023-06089-0

Alamsyah, A., Ruqaiyah, R., Handayani, T., & Nur, N. H. (2025). The impact of information exposure on husbands involvement in maternal emergency prevention. *AcTion: Aceh Nutrition Journal*, *10*(3), 820. https://doi.org/10.30867/action.v10i3.2717

American Psychological Association. (2022). *Anxiety during pregnancy can lead to earlier births, study finds*. Anxiety.

Angelia, F. E., Romdhoni, A. C., Izzati, D., & Atika. (2024). The relationship between husband's emotional support and anxiety of third trimester pregnant women at Lulu's independent midwifery practice Surabaya. *World Journal of Advanced Research and Reviews*, *21*(1), 691–697. https://doi.org/10.30574/wjarr.2024.21.1.0002

Asiedu, C., Asiedu, E. F. O., Johnson, E., & Bilson, S. E. (2026). Knowledge, role and perceptions of male partners on pre-eclampsia in sub-Saharan Africa: a systematic review of evidence from qualitative and quantitative studies. *Therapeutic Advances in Reproductive Health*, *20*, 1–16. https://doi.org/10.1177/https

Bedaso, A., Adams, J., Peng, W., Xu, F., & Sibbritt, D. (2022). An examination of the association between marital status and prenatal mental disorders using linked health administrative data. *BMC Pregnancy and Childbirth*, *22*(1), 1–10. https://doi.org/10.1186/s12884-022-05045-8

Benyian, F. F. (2025). Impact of prenatal anxiety on pregnancy outcome among women in Baghdad teaching hospitals. *Journal of Education and Health Promotion*, *14*, 102. https://doi.org/10.4103/jehp.jehp_670_24

Biggs, A., Brough, P., & Drummond, S. (2017). Lazarus and Folkman's Psychological Stress and Coping Theory. *The Handbook of Stress and Health*, 349–364. https://doi.org/10.1002/9781118993811.CH21

Boakye, D. S., Amoah, V. M. K., Amoah, C., Boateng, A. A., Aduomi-Botchwey, C. O., Bamfo, F., & Boampong, J. (2024). Eclampsia or epilepsy? The intriguing experiences of pregnant women diagnosed with preeclampsia and eclampsia: A descriptive exploratory study. *Sage Open Medicine*, *12*, 9. https://doi.org/10.1177/20503121241271768

CDC. (2022). *Preeclampsia, Genomics and Public Health*. Genomics and Precision Health.

Cohen, S., & Wills, T. A. (1985). Stress, Social Support, and the Buffering Hypothesis. *Psychological Bulletin*, *98*(2), 310–357. https://doi.org/10.1037/0033-2909.98.2.310

Cong, X., Wang, J., Yang, L., Cui, L., Hua, Y., & Gong, P. (2025). Pregnancy stress in women at high risk of preeclampsia with their anxiety, depression, self-management capacity: a cross-sectional study. *Frontiers in Psychology*, *16*(May), 1–11. https://doi.org/10.3389/fpsyg.2025.1537858

Elawad, T., Scott, G., Bone, J. N., Elwell, H., Lopez, C. E., Filippi, V., Green, M., Khalil, A., Kinshella, M. L. W., Mistry, H. D., Pickerill, K., Shanmugam, R., Singer, J., Townsend, R., Tsigas, E. Z., Vidler, M., Volvert, M. L., von Dadelszen, P., & Magee, L. A. (2024). Risk factors for pre-eclampsia in clinical practice guidelines: Comparison with the evidence. *BJOG: An International Journal of Obstetrics and Gynaecology*, *131*(1), 46–62. https://doi.org/10.1111/1471-0528.17320

Fitriani, F., & Anita, F. (2025). Impact of husband support on maternal psychological well-being during pregnancy: a systematic review. *Jurnal Edukasi Ilmiah Kesehatan*, *3*(2), 55–62. https://doi.org/10.61099/junedik.v3i2.112

Gibore, N. S., Ezekiel, M. J., Meremo, A., Munyogwa, M. J., & Kibusi, S. M. (2019). Determinants of men's involvement in maternity care in dodoma region, central

Tanzania. *Journal of Pregnancy*, *2019*. https://doi.org/10.1155/2019/7637124

Giménez, Y., González, E., Fatjó, F., Mallorquí, A., Hernández, S., Arranz, A., & Figueras, F. (2025). Anxiety and depression during pregnancy: Differential impact in cases complicated by preeclampsia and preterm premature rupture of membranes. *PloS One*, *20*(4), e0302114. https://doi.org/10.1371/journal.pone.0302114

Haryani, S., & Sari, C. K. (2026). *Association between husband support , maternal anxiety , and childbirth preparedness among third-trimester pregnant women*. *5*(4), 563–568.

Hezron, T. M., Dewi, T. P., Septivera, Y., Rajuddin, R., & Utami, N. A. (2025). Cortisol and pregnancy-related anxiety in relation to preeclampsia among third- trimester pregnant women: A case–control study from Aceh, Indonesia. *Narra J*, *5*(3), 1–8.

Jin, J., Bao, Y., Han, Y., Zhang, H., Zheng, Q., Zhao, X., Xu, X., Ji, D., & Wang, C. (2025). A study on the factors influencing pregnancy-related anxiety and its correlation with family functioning and social support among primiparous pregnant women in early pregnancy. *Journal of Obstetrics and Gynaecology Research*, *51*(7), e16333. https://doi.org/https://doi.org/10.1111/jog.16333

Kohan, S., Faghihi, S., Farajzadegan, Z., Rezavand, N., & Kamravamanesh, M. (2026). Exploring the Long-Term Emotional Trauma Experiences of Mothers With a History of Preeclampsia: A Qualitative Study. *Health Science Reports*, *9*(2), 1–12. https://doi.org/10.1002/hsr2.71733

Landa, V. C., & Wijayanti, T. R. A. (2025). The Influence of Spousal Support on Anxiety Among Women in the Third Trimester of Pregnancy at the Momalia Community Health Center. *The Journal General Health and …*, *3*.

Litasari, R., & Sunarni, N. (2025). Literature Review: Active Role of Husband in Care During Pregnancy Literature Review: Active Role of Husband in Care During Pregnancy. *Genius Midwifery Journal*, *04*(01), 2–7. https://doi.org/10.56359/genmj

Machenje, A. S., Kibusi, S. M., Gibore, N., Lilungulu, A., & Moshi, F. V. (2022). Knowledge and Myths about Preeclampsia and Eclampsia and its Influence on Antenatal Service Utilization among Pregnant Women and their Male Partners in Mtwara Regional - Tanzania: A Cross Sectional Analytical Study. In *Archives of Internal Medicine Research* (Vol. 05, Number 03). https://doi.org/10.26502/aimr.0122

Nasution, H. W., & Tinendung, D. S. (2025). the Relationship Between Husband'S Support and the Level of Anxiety Experienced By Pregnant Women At the Atikah Clinic, Panyabungan District, Mandailin G Natal Regency Year 2025. *Benih : Journal of Midwifery*, *04*(02), 496–504.

National University Health System. (2025). *Anxiety during pregnancy*.

Peters, M. D., Godfrey, C., McInerney, P., Munn, Z., Tricco, A. C., & Khalil, H. (2024). *Scoping reviews*. JBI. JBI Manual for Evidence Synthesis. https://doi.org/10.46658/JBIMES-24-09

Puspitasari, L., Harmayetty, & Kusumaningrum, T. (2020). Husband's knowledge related to their role in caring wives with preeclampsia risk. *Enfermeria Clinica*, *30*(2019), 161–163. https://doi.org/10.1016/j.enfcli.2019.11.045

Rasidah, R., & Rohmah, F. N. (2024). The Relationship Between Husband's Support and Anxiety Level of Primigravida Pregnant Women in Third Trimester at Puskesmas Gamping I, Sleman Yogyakarta. *Jurnal Ilmiah Kebidanan (The Journal Of Midwifery)*, *12*(1), 12–22. https://doi.org/10.33992/jik.v12i1.3162

Silawati, V., Effendi, N., & Author, C. (2025). Analysis of Stress Factors and Coping in Primigravida Pregnant Women in Jakarta. *International Journal of Health Sciences*, *3*(3), 51–71.

Thorgeirsdottir, L. T., Linden, K., Bergman, L., Sengpiel, V., Nyman, V., & Elden, H. (2023). The experience of being a partner to a childbearing woman whose pregnancy is

complicated by pre-eclampsia: A Swedish qualitative study. *Sexual & Reproductive Healthcare*, *36*, 100847. https://doi.org/https://doi.org/10.1016/j.srhc.2023.100847

Westphaln, K. K., Regoeczi, W., Masotya, M., Vazquez-Westphaln, B., Lounsbury, K., McDavid, L., Lee, H. N., Johnson, J., & Ronis, S. D. (2021). From Arksey and O'Malley and Beyond: Customizations to enhance a team-based, mixed approach to scoping review methodology. *MethodsX*, *8*, 101375. https://doi.org/10.1016/j.mex.2021.101375

World Health Organization. (2025a). *Perinatal Mental Health*.

World Health Organization. (2025b). *Pre-eclampsia*.

Yavuz, S., Yilmaz, S., & Aksoy, E. L. (2026). The relationship between spousal support during pregnancy , anxiety and quality of life : a cross-sectional study using structural equation modeling analysis. *BMC Pregnancy and Childbirth*.

Yuliadia, K., & Kartini, F. (2023). Experience of mothers with a history of preeclampsia in pregnancy. *International Journal of Health Sciences*, *7*(S1), 3029–3037. https://doi.org/10.53730/ijhs.v7ns1.14647